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Alaska Pulp Corporation Long-Term Timber Sale Contract

Final Supplement to the
Environmental Impact Statements
for the 1981-86 and 1986-90
Operating Periods

Analysis Area 6: Corner Bay

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Final Supplement to the Environmental Impact Statements
for the 1981-86 and 1986-90 Operating Periods

Alaska Pulp Corporation Long-Term Timber Sale Contract

Analysis Area 6: Corner Bay

U.S.D.A. - Forest Service
Alaska Region
Alaska

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Abstract

In compliance with the National Environmental Policy Act of 1969 and in response to the Federal District Court case, *Tenakee Springs v. Courtright*, the Forest Service has supplemented the Environmental Impact Statements for the 1981-86 and 1986-90 Operating Plans for the APC Long-Term Sale. The Supplement was prepared in two phases. An earlier document, Phase I, provided information and analysis about a number of issues, and proposed four Analysis Areas that should be further evaluated for timber harvest and road construction through the balance of the Plan period, ending December 31, 1990. This document discusses the site-specific environmental impacts for Analysis Area 6 on southeastern Chichagof Island.

This document addresses the issues from the 1986-90 EIS, the appeals issues, and the issues identified in the Court orders and settlement agreements including the Federal District Court case *Hanlon v. Barton*. Seven alternatives were developed by the Forest Service to address the issues, and the contract and Tongass Land Management Plan requirements. The alternatives include the No Action-Continued Direction/No Further Harvest Alternative 1 along with six action alternatives.

Alternative 2 proposes to harvest 53 million board feet (MMBF) and construct 26.7 miles of new road, while Alternative 3 and 4 would harvest 68 MMBF and build 31 and 37 miles of new road, respectively. Alternative 5 proposes to harvest 120 MMBF and construct 38 miles of new road. Alternative 6 would harvest about 80 MMBF and build 45 miles of new road. Alternative 7 would harvest about 79 MMBF and build 38 miles of new road.

Alternatives 2, 3, and 5 would use the Corner Bay logging camp, which is being expanded, along with the Corner Bay log transfer facility (LTF); these alternatives would also reactivate and expand the False Island logging camp and either renovate the False Island LTF or the Sitkoh Bay LTF. Alternatives 4 and 6 would use the Corner Bay logging camp and LTF. Alternative 7 would use the Corner Bay logging camp and LTF, the False Island logging camp, and the Sitkoh Bay LTF; this alternative would also reactivate the Todd LTF.

Alternatives 2, 3, 5, and 7 would not connect the Kadashan Road to the False Island road system, while Alternatives 4 and 6 would make this connection.

The analysis of effects concludes the seven alternatives would have varied impacts on the environment; these impacts fall within the guidelines of the Tongass Land Management Plan and other requirements. Likewise, the alternatives were found to be similar in addressing the issues, except for economic benefits where the No Action Alternative 1 would have detrimental effects on the local economy as a result of foregoing timber harvest. Action Alternatives 2 through 7 would have beneficial effects related to the amount of volume proposed for harvest, with Alternative 5 resulting in the most benefits to the local economy.

The ANILCA Section 810 Subsistence Evaluation concluded: 1) that none of the alternatives would cause an immediate or reasonably foreseeable significant possibility of a significant restriction of subsistence use of fish, other foods, and timber resources, and 2) the potential effects from Alternatives 1 through 7 present a significant possibility of a significant restriction of subsistence uses of wildlife. The analysis concluded that long-term cumulative effects of reasonably foreseeable activities may significantly restrict subsistence use. Subsistence Hearings were held in conformance with Section 810 of ANILCA.

Based on the results of the EIS, the Final SEIS recommends Alternative 4 as the preferred alternative, pending further consideration in the Record of Decision.

Summary

In 1956, the Forest Service and Alaska Lumber and Pulp, now Alaska Pulp Corporation (APC), entered into a timber sale contract that terminates in 2011. Every five years since implementation of the National Environmental Policy Act (NEPA), the Forest Service has prepared an environmental impact statement (EIS) for the succeeding Five-Year Operating Plan.

The Federal District Court Case, *Tenakee Springs v. Courtright*, challenged the adequacy of the 1981-86 Operating Plan EIS under NEPA. In its 1987 decision, the Court found that the Forest Service would need to prepare a supplement to the 1981-86 EIS to address issues raised by departures from the original 1981-86 Operating Plan. The departures have included the deletion or deferral of harvest units on lands selected for conveyance to Native Corporations under the Alaska Native Claims Settlement Act (ANCSA) of 1971.

In addition to changing the Operating Plan, the Court identified three other issues requiring further analysis including: the need to consider a no-action alternative specific to the Upper Game Creek area of Chichagof Island, the need for more site-specific detail regarding environmental effects of alternate road and harvest configurations in the upper Game Creek area, and additional analysis in the Upper Game Creek area of the foreseeable cumulative impacts on the environment resulting from an expanding network of roads and harvest units.

The Forest Service decided to supplement both the 1981-86 and 1986-90 EISs because both documents analyzed many of the same harvest areas and dealt with the same issues and re-analysis of issues in the 1981-86 EIS, and could affect the same issues in the 1986-90 EIS. The Notice of Intent to produce the Supplemental EISs was published in the Federal Register on October 15, 1987.

The EIS Supplement has been prepared in two phases. Phase I provided information and analysis of the issues, narrowing the focus from the whole APC Long-Term Timber Sale area to four specific Analysis Areas, 2, 3, 6, and 12, that should be further evaluated for timber harvest and road construction through the balance of the Plan period, ending December 31, 1990. The present draft Phase II document presents site-specific environmental impacts of proposed roads and harvest units in southeastern Chichagof Island, designated as Analysis Area 6.

This document uses four main chapters to discuss the purpose and need for supplementing the previous EISs, the alternatives including the proposed action, the existing conditions of the affected environment, and the environmental consequences of the alternatives as well as measures to mitigate adverse effects. A number of appendices contain supporting materials.

On the basis of the Phase I and Phase II SEIS analysis, the Regional Forester must decide:

- If the changes in land ownership, deferrals, deletions, or changes of timber-harvest units, and the effects of the Alaska National Interest Lands Conservation Act (ANILCA) subsistence legislation warrant amending the Records of Decision for the 1981-86 or 1986-90 EISs.
- If the contractual timber commitments between the date of publication of this document and December 31, 1990 (end of the 1986-90 Operating Period) should be met from Value Comparison Units (VCUs) that have some existing access roads and harvest units.
- If the contractual commitments are not met from previously roaded VCUs, how much additional timber will be needed and from which VCUs the timber harvest will be scheduled.

The issues discussed in the 1981-86 and 1986-90 EISs include:

1. The socioeconomic effects of logging and associated development on employment, business, populations, and quality of life.
2. The costs and benefits or trade-offs between environmental protection measures and the economics of the harvest activities.
3. The effects of timber harvest activities on fish habitat.
4. The effects of timber harvest activities on wildlife habitat.
5. The distribution of harvest by volume class.
6. The locations and environmental effects of log transfer facilities.
7. Maintaining resource values in high interest areas noted for fisheries, wildlife, recreation, or other values.
8. Effects on visual, recreation, and wilderness resources.

Other issues specified by the Court during the appeals process include consideration of a no-action alternative, consideration of effects on subsistence pursuant to Section 810 of ANILCA, and consideration of foreseeable long-term and cumulative effects of timber harvest. In 1988, a case (*Hanlon v. Barton*) filed in Federal District Court raised several issues regarding the effects of timber harvest near Hoonah on subsistence users. The Court recognized the merit of some claims which have implications for Analysis Area 6: consideration of a no further harvest alternative and consideration of "carryover" logging and road construction.

To address the issues and comply with NEPA regulations while meeting the APC Contract requirements, the Forest Service developed seven alternatives for the Analysis Area 6 Draft SEIS. Alternative 1, the No Action/Current Direction option, would permit the activities currently authorized by the Court to continue in nondeferred VCUs. A no further harvest option would stop all further road construction and timber harvest at the time of the Record of Decision. This option would remain in effect through December 31, 1990.

The six action alternatives propose a range of timber harvest related activities. Alternative 2 proposes to harvest 53.0 MMBF, construct 26.7 miles of system roads, and use the existing log transfer facility (LTF) and logging camp at Corner Bay, which is currently being expanded. This alternative would also reactivate and expand the False Island logging camp and renovate the False Island LTF or the Sitkoh Bay LTF. The Kadashan Road would not be connected to the Sitkoh Bay/False Island road system. Alternative 3 would harvest 68.1 MMBF, construct 31 miles of new road, use the Corner Bay logging camp and LTF, reactivate and expand the False Island logging camp, and renovate the False Island LTF or the Sitkoh Bay LTF. It would not complete the Kadashan Road. Alternative 4 proposes to harvest 67.5 MMBF, construct 37 miles of new road, and use the Corner Bay camp and LTF. The Kadashan Road would be completed to connect Corner Bay with the False Island road system. Alternative 5 would harvest 120.2 MMBF, construct 38 miles of new road, and use the Corner Bay camp and LTF. This alternative would also reactivate and expand the False Island logging camp and renovate the False Island LTF or the Sitkoh Bay LTF. It would not complete the Kadashan Road. Alternative 6 proposes to harvest 80.4 MMBF, construct 45 miles of new road, and use the Corner Bay camp and LTF. It would complete the Kadashan Road. Alternative 7 would harvest 79.3 MMBF and construct 38 miles of new road. This alternative would use the Corner Bay camp and LTF, reactivate and expand the False Island logging camp, and renovate the Sitkoh Bay and Todd LTFs. It would not complete the Kadashan Road.

The No Action Alternative 1 would have no additional environmental impacts. None of the action alternatives would locate roads or units on extreme-hazard soils; each of the alternatives would disturb soils over about 5 to 10 percent of most harvest units. The alternatives would alter noncommercial and understory species composition, but not to a significant ex-

tent. Scheduled planting and precommercial thinning would accelerate both conifer and understory growth rates for longer periods of time.

Action Alternatives 2 through 7 were projected to have varied impacts on wildlife and are within the TLMP requirements. None of the action alternatives would affect beach fringe, estuarine fringe, eagle sites, or inland wetlands. The alternatives would impact between none (Alternatives 4 and 6) and 2 percent (Alternative 5) of existing deer winter range. The alternatives would impact between none (Alternatives 2 and 7) and 6 percent (Alternative 5) of streamside/riparian zones. Potential project effects on projected deer, brown bear, and pine marten habitat capability range from slight to substantial, particularly when project effects are combined with past effects and are carried into the foreseeable future.

Each of the action alternatives would encroach into some Aquatic Habitat Management Units (AHMU), ranging in Class I habitat from 0.5 (Alternative 7) to 2.7 (Alternative 6) miles of one side of a creek, and from 0.1 (Alternative 7) to 3.5 (Alternative 4) miles of both sides of a creek. For Class II habitat, the figures range from 0.4 (Alternative 7) to 2.5 (Alternative 3) miles of one side of a creek, and from 0.2 (Alternative 7) to 6.2 (Alternative 2) miles of both sides of a creek.

The action alternatives prescribe AHMU protection measures for roads ranging from 0.4 (Alternative 2) to 1.4 (Alternative 6) miles. The alternatives would include from 7 (Alternative 2) to 17 (Alternative 6) Class I stream crossings that would require benefit/cost analysis. The alternatives pose no measurable potential for change in stream flows. The application of standards and guidelines to minimize soils impacts is expected to essentially prevent stream sedimentation.

While Alternatives 4 and 6 would not change the marine environment, Alternatives 2, 3, and 5 would reuse either the False Island or Sitkoh Bay log transfer facilities, with minor impacts on marine life. Alternative 7 would reuse both the Sitkoh Bay and Todd log transfer facilities. All of the alternatives have a low potential for impacting marine fisheries outside the sill, and little impact on salmon, herring, or crab is expected.

None of the alternatives would affect land status. All of the action alternatives would shift the recreation opportunities of some acres from semiprimitive-nonmotorized to roaded natural or roaded modified.

The action alternatives fail to fully meet assigned visual quality objectives in some VCUs ranging from one (Alternative 4) to six (Alternative 5). Impacts to cultural resources are not expected. The Forest Service would conduct inventory, evaluation, and mitigation of cultural resources sites according to an approved research design to avoid adverse impacts under any of the alternatives.

A Subsistence Evaluation was conducted pursuant to ANILCA Section 810, including public hearings held in subsistence communities in the vicinity of Analysis Area 2. It found that:

- (a) The potential foreseeable effects from Alternatives 1 through 7 of the proposed project in Analysis Area 6 present a no, or only slight significant possibility of a significant restriction of subsistence uses of fish, shellfish, timber and other foods.
- (b) The potential effects from Alternatives 2 through 7 of the proposed project in Analysis Area 6 present a significant possibility of a significant restriction of subsistence uses of wildlife.

The Final SEIS Findings further project subsistence use may be significantly restricted in Analysis Area 6 from the results of implementing long-term management direction in the Tongass Land Management Plan, from future actions on other surrounding lands, and from adding those potential effects to the foreseeable effects of the proposed action.

The six action alternatives were found to be similar in addressing most of the issues. Environmental impacts, including effects on fish and wildlife habitat and the marine environment,

visual resources, and recreation areas, were concluded to be minimal. The analysis found that none of the action alternatives would harvest a disproportionate amount or percentage of high volume stands. The action alternatives would provide a range of timber volume sufficient to maintain timber-dependent employment and services.

Chapter 4 of the document identifies numerous measures applied to mitigate the potential adverse impacts of timber harvest activities. These measures are used to protect and maintain fish and wildlife habitat, protect aesthetic values, prevent landslides and windthrow, and improve productivity of timber stands. Various Forest Service documents have discussed the standards, guidelines, monitoring, and mitigation measures in detail. Their purpose is to foresee and avoid or prevent potential problems in the planning phases of forest management. The potential effectiveness of proposed mitigation measures is also discussed.

The alternatives differ considerably in economic benefits. The no action Alternative 1 would result in a loss of some 167 jobs and almost \$4 million in salaries for the volume not harvested. By contrast, Alternative 2 would maintain 393 jobs and over \$9 million in salaries. Alternatives 3 and 4 would each maintain 535 jobs and over \$12 million in salaries. Alternative 5 would maintain 975 jobs and almost \$23 million in salaries. Alternative 6 would maintain 637 jobs and almost \$15 million in salaries. Alternative 7 would maintain 620 jobs and over \$14 million in salaries. In terms of reasonably foreseeable, long-term, and cumulative effects, all of the action alternatives would result in minimal impacts on all of the resources that were evaluated.

Selection of the no action Alternative 1 would likely cause a high level of public concern. This alternative would not facilitate development of additional roads into new areas, is lowest in effectiveness for implementing TLMP guidelines for LUD III and LUD IV areas, and lowest in effectiveness for providing contract volume to APC. Alternative 1 could reduce employment by the contract logger, Silver Bay Logging, as well as reduce the supply of wood to the Wrangell mill and reduce the supply of pulp to the APC Sitka plant. This alternative would require the Forest Service to provide sufficient volume in other parts of the APC Contract area, and may cause the Forest Service to breach its contractual obligations.

The volume harvested under Alternative 2 would not meet the minimum range projected in Phase I of the SEIS. The Forest Service would have to make up the additional volume in another level of public concern analysis area and may result in breaching the APC contract. Alternative 2 has the lowest risk of any alternative except No. 1, however, the economic benefits are the lowest, and the volume harvested per mile of road is low. This alternative is considered to be low to moderate in effectiveness to implement TLMP guidelines for LUD III and IV VCUs. Alternative 2 was considered to be moderately sensitive in public concern.

Alternative 3 would meet the minimum range of harvest projected in Phase I. This alternative has less potential for public concern than Alternative 2. It is considered moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs and low to moderate for LUD III VCUs.

Alternative 4 would also meet the minimum range of harvest projected in Phase I. It has a high potential for public concern associated with the proposed connection of the Kadashan Road and the proposed timber harvest in Trap Bay (VCU 237). This alternative is considered moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs and low to moderate for LUD III VCUs.

Alternative 5 exceeds the upper range of harvest range projected in Phase I. It has the greatest potential for public concern as timber harvest and road construction are proposed in the Kadashan watershed (VCU 235) and Trap Bay watershed (VCU 237). Both VCUs are high public interest areas. The alternative also proposes harvest and road construction in two VCUs that have been selected by Angoon and are highly visible from the Alaska Marine Highway

route along Chatham Strait. Alternative 5 is considered high in effectiveness to implement TLMP guidelines for LUD IV VCUs and moderate to high for LUD III VCUs.

Alternative 6 also exceeds the upper range of harvest level projected in Phase I. Alternative 6, like Alternative 5, has a high potential for public concern as timber harvest and road construction are proposed in Kadashan and Trap Bay (VCUs 235 and 237). Alternative 6 is considered high in effectiveness to implement TLMP guidelines for LUD IV VCUs and moderate to high for LUD III VCUs.

Alternative 7 would harvest slightly more than the upper range volume projected in Phase I. It has high potential for public concern associated with harvest in Kadashan and Trap Bay. In addition, the proposed harvest of the Todd blowdown units has some risk resulting from lack of favor with APC and ADF&G. Alternative 7 is considered moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs and low to moderate for LUD III VCUs.

Forest Service staff evaluated the benefits and impacts of each alternative against the issues to recommend the preferred alternative. Alternative 4 is tentatively identified as the preferred alternative, pending further consideration in the Record of Decision.

Table of Contents

Abstract	iii
Summary	v
Table of Contents	xi
List of Figures	xix
List of Tables	xxi

Chapter 1

Purpose and Need

Introduction	1
Definitions	6
Background	8
Management of the Analysis Area	13
Purpose and Need	15
Public Involvement	16
Issues	16
Issues Described in the 1981-86 and 1986-90 FEISs	17
Issue 1	17
Issue 2	17
Issue 3	17
Issue 4	18
Issue 5	18
Issue 6	18
Issue 7	18
Issue 8	19
1986-90 Administrative Appeal Issues	19
Issues Outside the Scope of this SEIS	20
Permits and Licenses	20

Chapter 2

Alternatives Including the Proposed Action

Introduction	1
Formulation of Alternatives	2
Alternatives Considered But Eliminated From Detailed Study	2
Alternatives Evaluated in this EIS	3
Alternative 1: No Action - Current Direction and No Further Harvest	3
Alternative 2	4
Alternative 3	6
Alternative 4	8
Alternative 5	10
Alternative 6	13
Alternative 7	16

Comparison of the Alternatives	19
Impact Comparison	19
Issue Comparison	26
Economic Comparison of Alternatives	37
Effectiveness Comparison	38
Standards, Guidelines, and Mitigation Measures	41
Identification of the Forest Service Preferred Alternative	41

Chapter 3

Affected Environment

Introduction	1
Soils	2
Vegetation	8
Threatened and Endangered Species	8
Timber	8
Mature and Overmature Timber	9
Commercial Forest Land	10
Operable and Inoperable CFL	11
Timber Harvested	12
Silvicultural Treatments	12
Timber Volume Available	14
Timber Harvest Modifications from APC 1981-86 ROD and APC 1986-90 ROD	14
Roads	14
Log Transfer Facilities, Logging Camps, and Administrative Sites	15
Wildlife	17
Wildlife Habitats	17
Emphasis Habitats	18
Deer Winter Range	21
Inland Wetland	22
Beach Fringe	22
Estuarine Fringe	22
Streamside Riparian	23
Old-Growth Forest	23
Wildlife Species	24
Emphasis Species	26
Sitka Black-tailed Deer	26
Brown Bear	30
Pine Marten	32
Land Otter	34
Bald Eagle	35
Vancouver Canada Goose	37
Threatened or Endangered Species	37

Fisheries	37
Watersheds	40
Stream Temperature	40
Sediment	41
Streamflow	41
Marine Environment	42
Land Status	44
Private Lands	44
Native Selections	44
Native Allotments	44
Withdrawals	44
Mining Claims	44
Special Use Permits	45
Rights-of-Way Aquired	45
Recreation	45
Current Use	45
Recreation Opportunities	45
Recreation Sites	47
Visual Resources	48
Cultural Resources	52
Socioeconomics	53
Regional Economy	53
Population	58
Employment	58
Economic Uses of the Forest	59
Timber Harvest	63
Commercial Fishing	64
Tourism and Recreation	71
Subsistence	73
Angoon	75
Tenakee Springs	77
Sitka	80
Hoonah	80
Wrangell	81
Klukwan	85
Petersburg	85
Kake	86
Haines	88
Use of Analysis Area VCUs	89

Chapter 4

Environmental Consequences

Introduction	1
Resource Categories	2
Soils	2
Vegetation	4
Timber	5
Wildlife	9
Wildlife Habitats	9
Deer Winter Range	12
Inland Wetland	12
Beach Fringe	14
Estuarine Fringe	16
Streamside Riparian	16
Old-Growth Conditions	16
Emphasis Species	19
Black-tailed Deer	19
Brown Bear	19
Pine Marten	24
Land Otter	25
Bald Eagle	26
Vancouver Canada Goose	26
Conclusions for Wildlife Effects	26
Fisheries	26
Watersheds	32
Streamflow	34
Sediment	35
Marine Environment	36
Land Status	37
Recreation	38
Visual Resources	43
Cultural Resources	47
Employment Impacts	48
Economic Impacts	50
Reasonably Foreseeable, Long-Term, and Cumulative Effects	52
Assumptions	53
Vegetation/Timber	54
Plant Successional Changes Following Harvest	54
Projected Timber Harvest through 2011	55
Mature and Overmature Timber	56
Second-Growth Stands	57
Transportation	58

Wildlife	63
Wildlife Habitats	63
Deer Winter Range	63
Inland Wetland	63
Beach Fringe	64
Estuarine Fringe	65
Streamside Riparian	65
Old-Growth Conditions	65
Wildlife Species	65
Sitka Black-tailed Deer	65
Brown Bear	65
Pine Marten	70
Land Otter	70
Bald Eagle	70
Vancouver Canada Goose	73
Fisheries/Hydrology	73
Changes to Upland Streams	73
Changes to Lowland Streams	74
Large Organic Debris/Channel Stability - Fish Habitat	74
Stream Temperature	75
Nutrient Cycling	75
Streamflow	75
Streamside Disturbance Effects	77
Mass Wasting Effects	77
Soils	78
Marine Environment	79
Recreation	79
Visual Resources	82
Cultural Resources	85
Socioeconomic Impacts	85
Contribution of Timber from State and Private Lands	86
ANILCA Section 870 Subsistence Evaluation	86
Draft SEIS Evaluation	88
Hearings	88
Final SEIS Findings	90
WILDLIFE FINDINGS	91
Abundance or Redistribution	91
Access	97
Competition	98
Finding	99

FISH AND SHELLFISH FINDINGS	99
Abundance or Redistribution	100
Access	101
Competition	101
Finding	102
OTHER FOODS FINDINGS	102
Abundance or Redistribution	102
Access	102
Competition	104
Finding	104
TIMBER FINDINGS	104
Mitigation	104
Reasonably Foreseeable, Long-Term, and Cumulative Programmatic Effects	105
Final Conclusions	106
Other Environmental Considerations	107
Unavoidable Adverse Environmental Effects	107
Relationship Between Short-Term Uses and Long-Term Productivity	107
Irreversible and Irretrievable Commitments of Resources	107
Possible Conflicts Between the Alternatives and Other Land Use Objectives	108
Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment	108
Mitigation	108

Chapter 5

List of Preparers

US Forest Service	1
Dames & Moore	9
Photo Contributors	11

Chapter 6

List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent	1
--	---

Chapter 7

Literature Cited	1
------------------------	---

Chapter 8

Glossary

Acronyms Used in Text	1
Terms Used in Text	2

Chapter 9

Index	1
-------------	---

Appendices

Consolidated
Appendices
Volume I

Unit Cards A-1

ANILCA Section 810 Hearing Record

Angoon B-1

Gustavus B-2

Hoonah B-3

Kake B-4

Pelican B-5

Petersburg B-6

Point Baker and Port Protection B-7

Port Alexander B-8

Sitka B-9

Tenakee Springs B-10

Wrangell B-11

Other Communities B-12

Forest Service Response to Subsistence Hearings B-13

Volume II

Public Comments and Forest Service Responses, Phase I and Phase II

Phase I Comments C-1

Phase II Comments C-2

Forest Service Thematic Responses C-3

Theme Response 1: Public Involvement

Theme Response 2: H.R. 987

Theme Response 3: Brown Bear

Theme Response 4: Site Specificity

Theme Response 5: Subsistence

Theme Response 6: Planning Process

Theme Response 7: Sitka Black-Tailed Deer

Theme Response 8: Planning Record versus EIS Display of Data

Theme Response 9: Data and Models

Summary of Public Concerns C-4

Volume III

Supporting Information, Phase I and Phase II

Notice of Intent D

Habitat Capability Models:

Sitka Black Tailed Deer E-1

Brown Bear E-2

Pine Marten E-3

Responses to Phase I Public Concerns	F
Summary of 1986-90 Appellants' Reasons for Appeal	G
Threatened and Endangered Species Consultation	H
Logistical Constraints	I
Monitoring Requirements	J
Economic Data	K
January 4, 1985 Letter of Agreement between Corporation and USDA, Forest Service	L
APC 1986-90 Operating Plan Appraisal	M
Discussion Concerning Individual VCUs in the Sale Area	N

List of Figures

Chapter 1

1-1	The Relationship of this Supplemental Environmental Impact Statement to Earlier Documents	2
1-2	Vicinity Map of the APC Contract Area	4
1-3	Phase II Analysis Areas for APC Contract Area	5
1-4	How this Supplemental Environmental Impact Statement is Organized	6
1-5	Geographical and Management Subunits	7
1-6	Distribution of Land Use Designations (LUDs), Commercial Forest Land, and Scheduled Timber Harvest in the Chatham Area.....	13

Chapter 2

2-1	Road Construction Required for Each Alternative in Each VCU.....	26
2-2	Cumulative Percentage of Volume Classes, Including Proposed Harvest	32

Chapter 3

3-1	Percentage of Timber Land Types in Analysis Area 6	11
3-2	ADF&G Map; Harvest Areas, Southeastern Alaska	25
3-3	Cultural Resource Sites.....	54
3-4	Employment in Southeast Alaska Compared to Total US Employment.....	56
3-5	Change in Gross State Product for Alaska and USA, 1978-1986	57
3-6	Selected Alaskan Exports of Forest Products, 1980-1987	57
3-7	Seasonality of Selected Southeast Alaska Employment, 1987	58
3-8	Unemployment Rates, 1980-1987	60
3-9	Fishery Employment in Southeast Alaska, 1979-1984	62
3-10	Estimated Average Annual Value of Salmon Produced in Analysis Area 6.....	63
3-11	Direct and Indirect Employment in Forest Products, Fishing, Fish Processing, Tourism, and Resident Recreation, 1980-1988	65
3-12	Lumber and Wood Products Industry Employment in Southeast Alaska, 1980-1988	66
3-13	Source of Timber Processed in Southeast Alaska	67
3-14a	Forest Product Exports from Alaska to All Destinations	68
3-14b	Forest Product Exports from Alaska to All Destinations	69
3-15	Household Participation in Commerical Fishing and Fish Processing by Community	70
3-16	Number of Hunter Days in Southeast Region	72
3-17	Angler Days in Southeast Alaska, 1980-1985	72
3-18	Traditional Use Area of the Angoon Tlingit	76
3-19	1987 Harvest of Principal Subsistence Resources - Angoon	77
3-20	1987 Harvest of Principal Subsistence Resources - Tenakee Springs	79

3-21	1987 Harvest of Principal Subsistence Resources - Sitka	81
3-22	Territories of Hoonah Tlingit Clans, 1946	82
3-23	1987 Harvest of Principal Subsistence Resources - Hoonah	83
3-24	1987 Harvest of Principal Subsistence Resources - Wrangell	84
3-25	1987 Harvest of Principal Subsistence Resources - Klukwan	86
3-26	1987 Harvest of Principal Subsistence Resources - Petersburg	87
3-27	1987 Harvest of Principal Subsistence Resources - Kake	88
3-28	1987 Harvest of Principal Subsistence Resources - Haines	89
3-29	Angoon Use of Analysis Area VCUs	90
3-30	Tenakee Springs Use of Analysis Area VCUs	91
3-31	Sitka Use of Analysis Area VCUs	92
3-32	Klukwan Use of Analysis Area VCUs	93
3-33	Hoonah Subsistence Core Use Areas	94
3-34	Hoonah Use of Analysis Area VCUs	95
3-35	Wrangell Use of Analysis Area VCUs	96

Chapter 4

4-1	Roads - Existing, Scheduled, and Proposed	60
4-2	Project Specific Effects on Projected Black-tailed Deer Habitat Capability Through One Timber Crop Rotation	66
4-3	Comparison of Projected Black-tailed Deer Habitat Capability Through One Timber Crop Rotation	66
4-4	Project Specific Effects on Projected Brown Bear Habitat Capability Through One Timber Crop Rotation	68
4-5	Comparison of Projected Brown Bear Habitat Capability Through One Timber Crop Rotation	69
4-6	Project Specific Effects on Projected Pine Marten Habitat Capability Through One Timber Crop Rotation	71
4-7	Comparison of Projected Pine Marten Habitat Capability Through One Timber Crop Rotation	72

List of Tables

Chapter 2

2-1	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 1	3
2-2	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 2	5
2-3	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 3	7
2-4	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 4	9
2-5	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 5	11
2-6	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 6	14
2-7	Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 7	17
2-8	Summary Comparison of Alternatives	20
2-9	Projected Changes in Wildlife Habitat Capability Based on Models	29
2-10	Changes in Wildlife Habitat Due to Timber Harvest	30
2-11	Changes in Old-Growth Habitat Prescriptions Due to Timber Harvest	31
2-12	Acres Proposed for Harvest	31
2-13	Economic Contribution of Alternatives	38
2-14	Costs to an Operator of Average Efficiency (Million\$)	38
2-15	Values to an Operator of Average Efficiency (Million\$)	38

Chapter 3

3-1	Commercial Forest Land by Volume Class in Acres	12
3-2	Past Timber Harvest In Acres (TLMP)	13
3-3	Timber Volume Available from Nondeferred and Partially Deferred VCUs	14
3-4	Existing Roads in Miles	15
3-5	Existing Acres of Wildlife Habitat Prior to Recorded Timber Harvest	18
3-6	Wildlife Habitats Harvested to 1990	19
3-7	Wildlife Habitats Remaining After 1986-1990 Authorized Timber Harvest	20
3-8	Number of Sitka Black-tailed Deer Harvested	27
3-9	Number of Deer Hunter Days	27
3-10	Number of Deer Hunters	27

3-11	Hunter Desires for Deer by Subsistence Community	29
3-12	Comparison of Projected Sitka Black-tailed Deer Habitat Capability, 1988 Harvest, and Numbers Identified to Support Harvest	29
3-13	Projected Deer Numbers Based on a Sitka Black-tailed Deer Habitat Capability Model	30
3-14	Number of Brown Bears Harvested	32
3-15	Projected Brown Bear Numbers Based on a Habitat Capability Model	33
3-16	Number of Pine Martens Harvested	34
3-17	Projected Pine Marten Numbers Based on a Habitat Capability Model	35
3-18	Number of Land Otters Harvested	36
3-19	Number of Eagle Nests	37
3-20	Average Annual Weight of Salmon Available for Commercial Harvest in Thousands of Pounds	39
3-21	Summary of Stream Miles by Stream Classification, and Miles and Percentage of Streams with Adjacent Harvest	40
3-22	Existing Recreation Opportunity Spectrum Classes in Acres	46
3-23	Existing Visual Condition (EVC) in Acres	48
3-24	Assigned Visual Quality Objectives in Acres	49
3-25	Previous Cultural Resource Surveys	53
3-26	Population Change in Southeast Region in 1980 and 1986	59
3-27	Southeast Alaska Employment from 1981 to 1987	61
3-28	Deer Hunting by Community in 1985	73
3-29	Role of Subsistence in Community Lifestyles	74
3-30	Deer Hunter Days, Harvest, and Average Number of Hunter Days to Harvest in Major Harvest Area 33, 1985-1987	97
3-31	Deer Hunter Days, Harvest, and Average Number of Hunter Days to Harvest in Major Harvest Area 36, 1985-1987	97

Chapter 4

4-1	Proposed Timber Harvest by Soil Hazard Class (Acres)	3
4-2	Effects of Harvest on Land Base, CFL, and Normal Operable CFL	5
4-3	Proposed Timber Harvest by Site Class (Acres)	6
4-4	Forested Habitat Affected by Alternative	10
4-5	Forested Habitat Remaining by Alternative	11
4-6	Deer Winter Range Habitat Affected by Alternative	12
4-7	Deer Winter Range Habitat Remaining by Alternative	13
4-8	Beach Fringe Habitat Affected by Alternative	14

4-9	Beach Fringe Habitat Remaining by Alternative	15
4-10	Streamside Riparian Habitat Affected by Alternative	16
4-11	Streamside Riparian Habitat Remaining by Alternative	17
4-12	Old-Growth Habitat Affected by Alternative in Acres	18
4-13	Projected Percent Reduction of Potential Sitka Black-tailed Deer Numbers Based on a Habitat Capability Model	20
4-14	Projected Reduction of Potential Black-tailed Deer Numbers Based on a Habitat Capability Model	21
4-15	Projected Percent Reduction of Potential Brown Bear Numbers Based on a Habitat Capability Model	22
4-16	Projected Reduction of Potential Brown Bear Numbers Based on a Habitat Capability Model	23
4-17	Projected Percent Reduction of Potential Pine Marten Numbers Based on a Habitat Capability Model	24
4-18	Projected Reduction of Potential Pine Marten Numbers Based on a Habitat Capability Model	25
4-19	Buffer Width and Distance Along a Stream	27
4-20	Miles of Road Needing AHMU Protection Measures by Stream Class	31
4-21	Acres of Proposed Timber Harvest by Channel Type	33
4-22	Recreation Opportunity Spectrum Classes Resulting from the Alternatives in Acres	40
4-23	Changes in Visual Condition in Acres	43
4-24	Cultural Resource Impacts	48
4-25	Jobs and Wages Maintained for Each Alternative	49
4-26	Timber Harvest and Manufacturing Costs in Millions of Dollars	50
4-27	Transportation Costs.....	51
4-28	Unit Costs (\$ per MBF) for Harvest, Transportation, and Manufacturing	51
4-29	Average Structural Characteristics of Managed Stands by Site Classification	56
4-30	Foreseeable and Long-term Timber Harvest by 2011	57
4-31	Proposed Road Construction and Road Density	61
4-32	Projected Road Construction (Miles) and Road Density Through 2011.....	62
4-33	Clearing Requirement for Road Development (Acres)	62
4-34	Wildlife Habitats Remaining After Projected Harvest Through 2011	64
4-35	Area and Percentage of Watersheds Projected to be Harvested Through 2011	76

4-36	Acres of Hazard Soils Affected by Harvest Units and Roads as a Percentage of the Total VCU Area	77
4-37	Proposed Timber Harvest in Important Subsistence Areas	92
4-38	1987 Deer Harvest for ADF&G Minor Harvest Areas 3308, 3627, and 3628	98
4-39	1988 Deer Harvest for ADF&G Minor Harvest Areas 3308, 3627, and 3628	99
4-40	Significant Possibility of a Significant Restriction of Subsistence Use of Wildlife Resources	100
4-41	Significant Possibility of a Significant Restriction of Subsistence Use of Fish Resources	102
4-42	Proposed Timber Harvest Units Located in or Adjacent to Potential Beach Gathering Areas for Other Food Resources	103
4-43	Significant Possibility of a Significant Restriction of Subsistence Use of Other Food Resources	104

Chapter 1

Purpose and Need



Chapter 1

Purpose and Need

This is one of four Phase II documents describing further environmental analysis conducted to supplement information previously provided in the Environmental Impact Statements (EISs) for the 1981-86 and 1986-90 Operating Periods for the Alaska Pulp Corporation (APC) Long-Term Timber Sale Contract. This Phase II document addresses site-specific environmental impacts attributable to road construction and timber harvest for a portion of Chichagof Island. This supplemental document is “tiered” to previous documents, which means that it builds on the analysis of the earlier documents. The information from the previous documents is hereby incorporated by reference and only significant conclusions or analyses from them are summarized here. The relationship or tiering of this document to earlier ones is shown in Figure 1-1. The reader is referred to the documents listed below for many of the details of ongoing issue discussions:

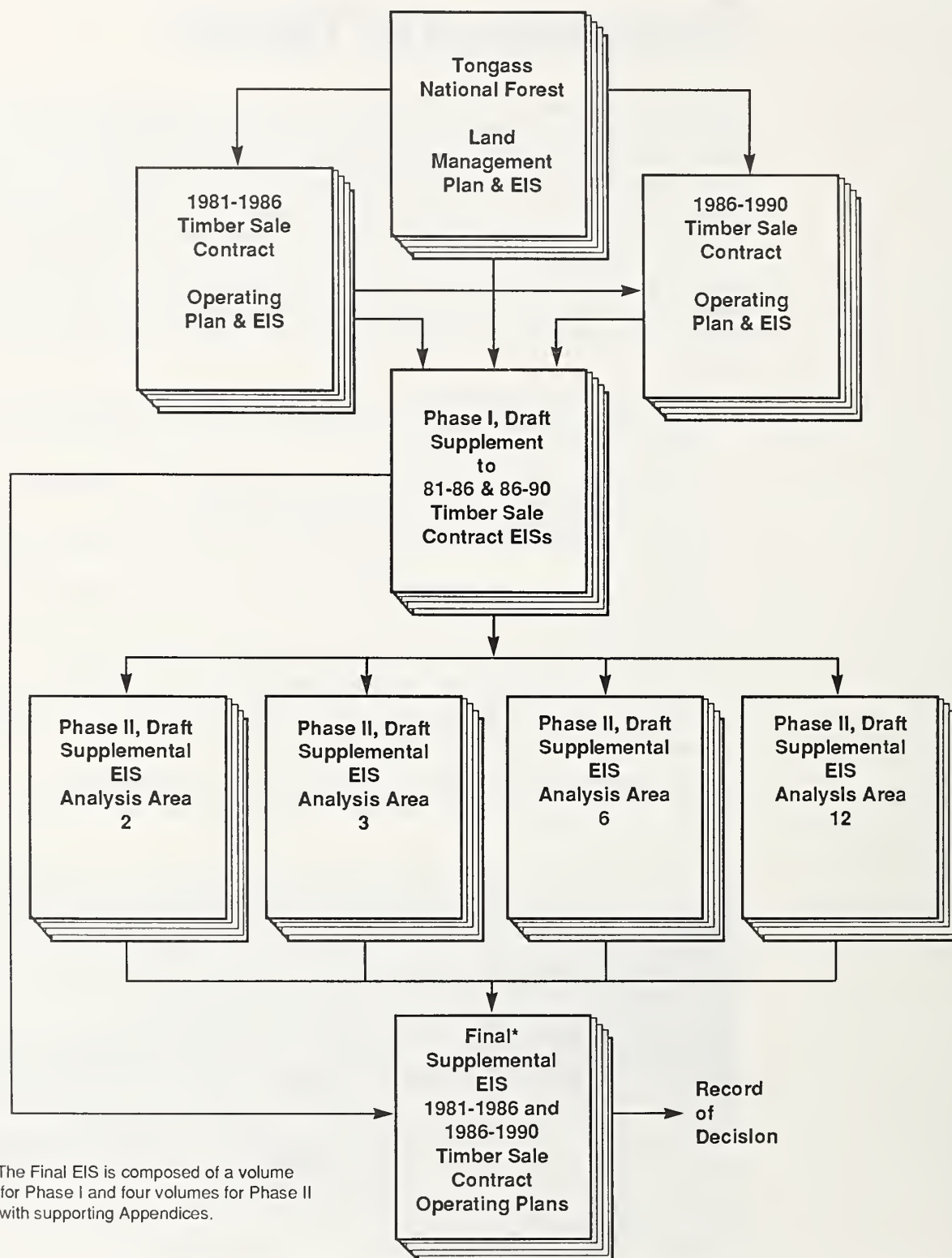
1. Alaska Pulp Corporation Long-Term Timber Sale Contract, Draft Supplement to the Environmental Impact Statements for the 1981-86 and 1986-90 Operating Periods, Phase I, August 1988 (Forest Service 1988a).
2. Notice of Intent to prepare a supplement to Environmental Impact Statements, published in the Federal Register on October 15, 1987 (Barton 1987).
3. Alaska Lumber and Pulp Company 1981-86 Operating Plan FEIS, 1980 (Forest Service 1980a).
4. Alaska Pulp Corporation 1986-90 Operating Period FEIS, 1986 (1986-90 FEIS) (Forest Service 1986b).
5. Tongass Land Management Plan (TLMP) and Final EIS, 1979 (Forest Service 1979a).
6. Tongass Land Management Plan, Amended, 1986 (Forest Service 1986d).
7. Alaska Regional Guide, November 1983 (incorporated by reference into the Tongass Land Management Plan) (Forest Service 1983a).
8. Alaska Lumber and Pulp Company Timber Sale Contract; Contract Number 12-11-010-1545, 1956, with the Washington Office, Forest Service, Washington, D.C. (Forest Service 1956).

Sitka Indian Village 1936



Figure 1-1

The Relationship of this Supplemental Environmental Impact Statement to Earlier Documents



The supplement to the 1981-86 and 1986-90 FEISs (the SEIS) has been divided into two phases. Phase I concluded that there was not sufficient volume available from non-deferred harvest units to meet the Forest Service's obligations to APC in the APC contract area (Figure 1-2). Phase I, therefore, identified four specific geographic areas or analysis areas (Figure 1-3) for further analysis in Phase II. The Phase II SEISs document site-specific environmental impacts that would be caused by road construction and timber harvest in the four analysis areas that should be entered by December 31, 1990 and compares a no-action alternative. This document addresses the Phase II studies for the portion of Chichagof Island designated as Analysis Area 6.

This document, the Phase II SEIS for Analysis Area 6, is divided into four main chapters, as shown in Figure 1-4. Supporting material is included in appendices. Chapter 1, Purpose and Need, presents (1) a summary of the historical background for the reviewer to better understand the purpose of and need for supplementing the previous EISs and (2) the issues that were identified and are addressed in the following chapters. Chapter 2, Alternatives Including the Proposed Action, describes and compares the alternatives specifically developed to resolve the issues described in Chapter 1 and fulfill the APC Long-Term Contract. Chapter 3, Affected Environment, describes the existing conditions of the environment that would be affected by the actions associated with the alternatives. Chapter 4, Environmental Consequences, describes the potential consequences, or impacts, to that environment.

Divide Between Kook Lake and Corner Creek Drainages



1 Purpose and Need

Figure 1-2

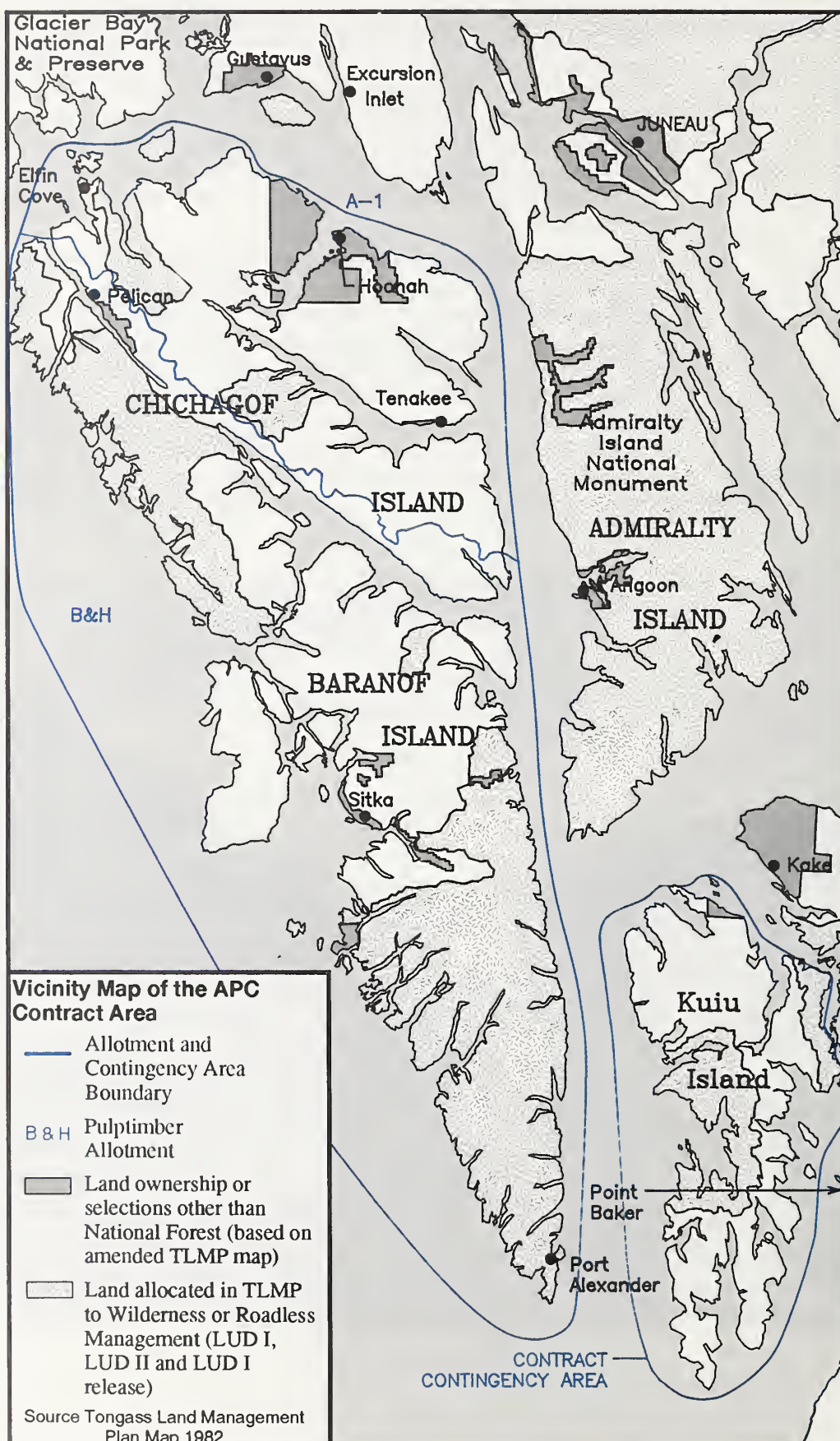


Figure 1-3

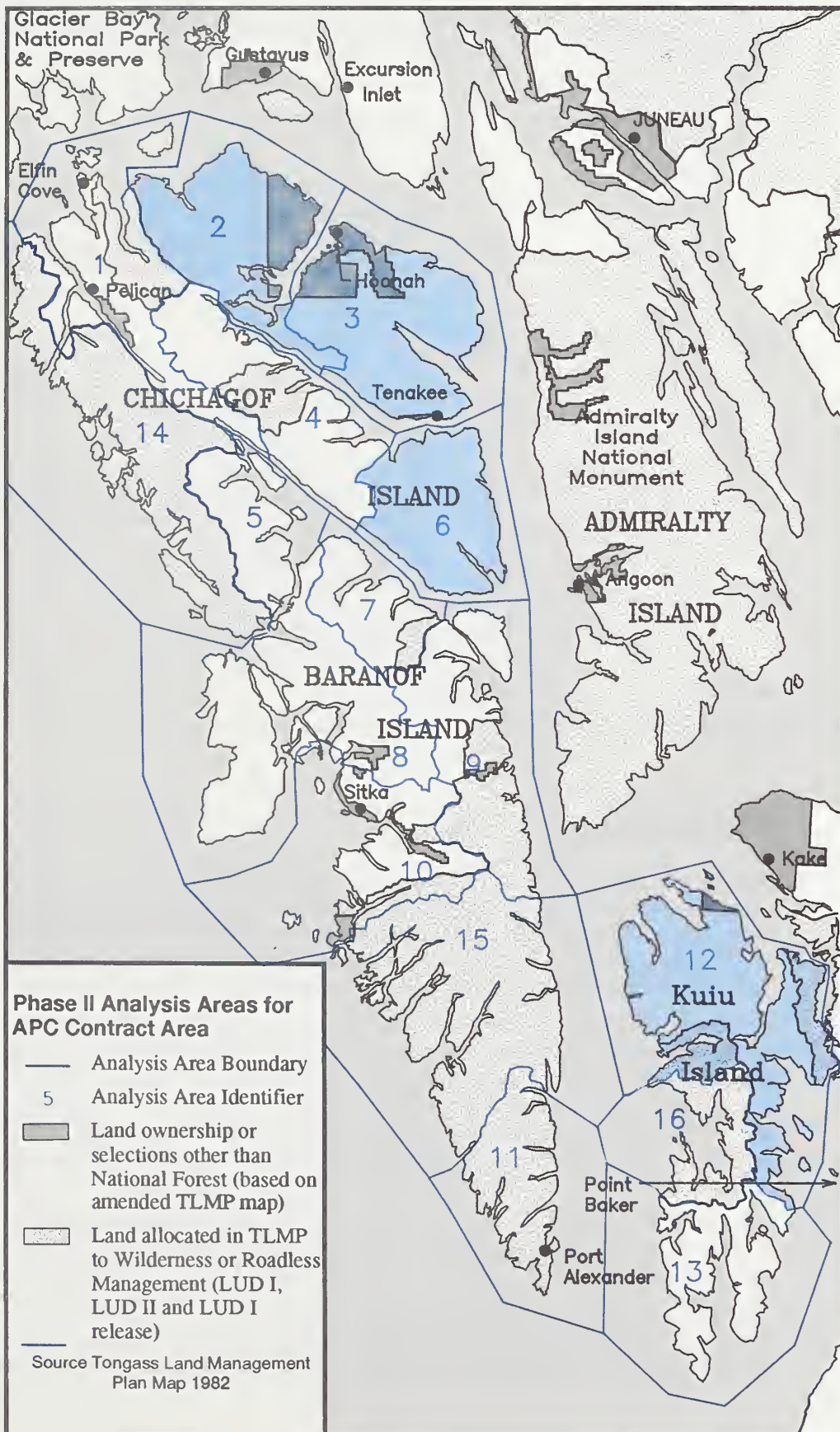
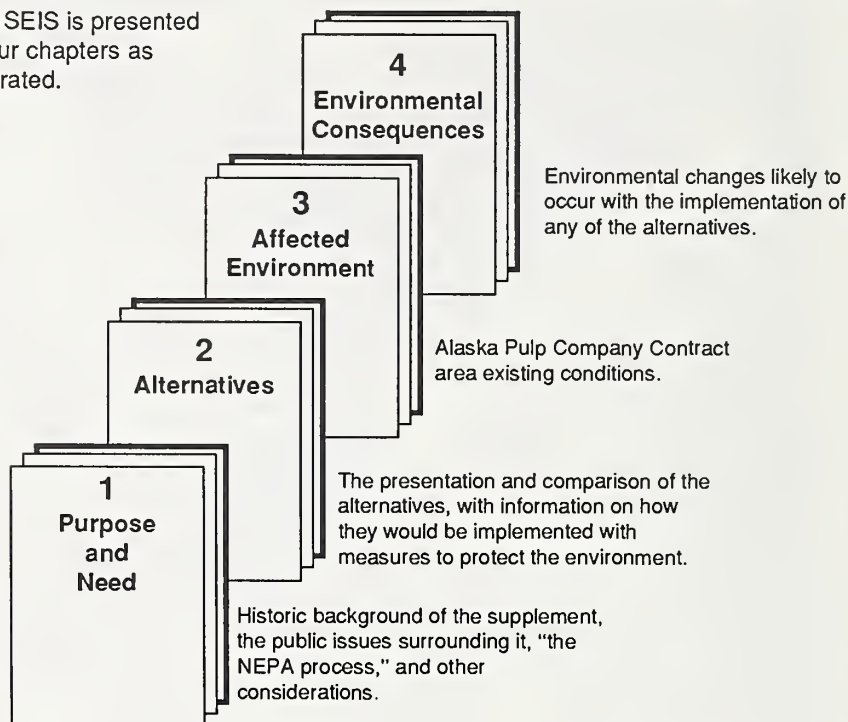


Figure 1-4

How this Supplemental Environmental Impact Statement is Organized

This SEIS is presented in four chapters as illustrated.



Definitions

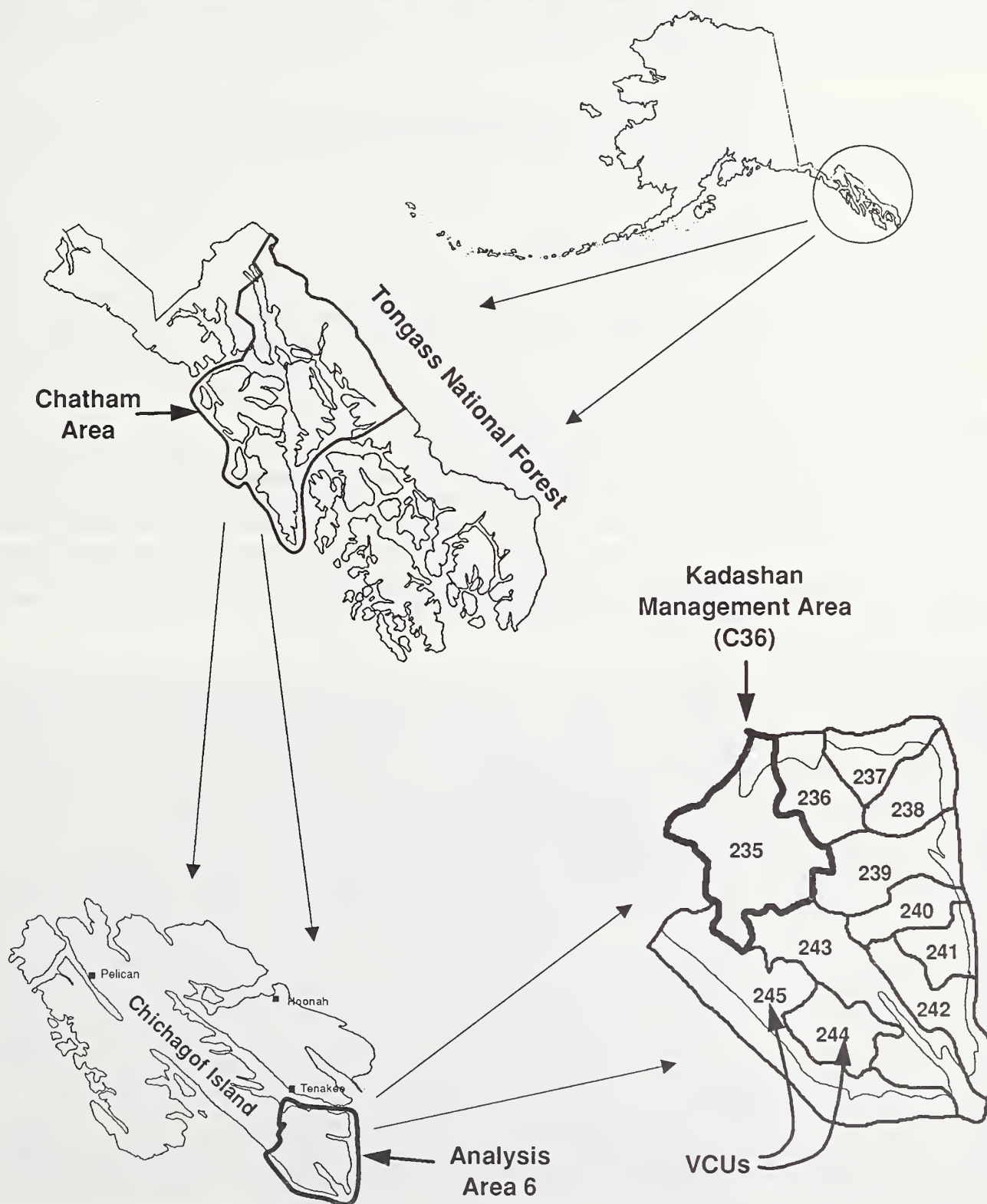
The majority of project-specific terms and acronyms are defined in the glossary in this document. However, clarification should be made on a few terms of geographical land subunits in the Tongass National Forest used by the Forest Service for administrative management: Value Comparison Unit (VCU), deferred and nondeferred VCUs, Management Area, and Analysis Area. Figure 1-5 illustrates the hierarchical relationships of these subunits.

Value comparison units have been established in the Tongass National Forest in order to facilitate the use of a common set of resource inventories and interpretations of resource values for management purposes. A VCU is used as a planning unit and is defined as a geographically distinct area that generally encompasses a drainage basin containing one or more large stream systems. The boundaries of a VCU usually follow easily recognizable watershed divides. In some cases, an island or a group of small islands comprise a single VCU. The VCUs average about 17,500 acres in size, Forest wide.

A deferred VCU is one in which further road construction and/or timber harvest is postponed pending completion of the supplement (Settlement Agreement, April 1988). All deferred VCUs are listed in the Notice of Intent (September 1987). The deferred VCUs in Analysis Area 6 are VCUs 235, 237, and 238.

A nondeferred VCU is one in which timber harvest and road construction may proceed as scheduled in the 1981-86 and 1986-90 Operating Plans without being further evaluated in the

Figure 1-5
Geographical and Management Subunits



1 Purpose and Need

SEIS (Settlement Agreement, April 1988). Additional harvest units and access roads will be considered in nondeferred VCUs as an alternative to entry into deferred VCUs. The nondeferred VCUs in the Analysis Area 6 are VCUs 236, 239, 240, 241, 242, 243, 244, and 245.

Management areas, larger planning units identified in the Tongass Land Management Plan (Forest Service 1979a, 1986d), provide a broader perspective for forest management decisions. Management areas are composed of VCUs that have similar resource and physical characteristics.

Analysis areas generally are combinations of two or more management areas. The grouping of management areas is consistent with the direction found in the 1980-86 Tongass Land Management Plan Amendment (Forest Service 1986d) and is discussed in SEIS Phase I, Chapter 2.

Background

In 1956, Alaska Lumber and Pulp, now Alaska Pulp Corporation (APC), entered into a contract with the Federal government prescribing terms for timber sales and logging in Southeast Alaska for a 50-year period between 1961 and 2011 (Forest Service 1956). During that period, the contract provides for harvesting 4,974,700,000 board feet of sawlog grade timber within the sale, or contract area (Figure 1-2), which includes parts of Baranof, Chichagof, Kuiu, and associated islands.

Since 1971, the Forest Service, United States Department of Agriculture, has specifically planned and authorized logging, road construction, and related activities for successive five-year periods. The Forest Service has determined that these five-year Operating Plans are major federal actions significantly affecting the human environment, thus requiring preparation of an EIS under the National Environmental Policy Act (NEPA). Since the enactment of NEPA, an EIS has been prepared for each succeeding five-year Operating Plan. The EISs evaluate the proposed actions and the potential effects the Operating Plans may have upon the environment.

Forest Service Administrative Site at False Island in Peril Strait



The Alaska Native Claims Settlement Act (ANCSA) (85 Stat. 688, as amended), was approved December 18, 1971 to provide for the settlement of certain land claims of Alaska natives. ANCSA has been the basis for conveying selected lands under administrative jurisdiction of the Tongass National Forest to Native corporations (any regional, village, or urban corporation, or Native group). Under ANCSA, Native corporations have selected over 500,000 acres from the Tongass National Forest, but not all of the land has been conveyed to them. The selected and yet unconveyed lands remain in a state of suspension, unavailable for corporation management and restricted from public management.

On December 2, 1980, the Alaska National Interest Lands Conservation Act (ANILCA), Public Law 96-487, was enacted to provide for the designation and conservation of certain public lands in the State of Alaska. This act established a number of areas for the purpose of preserving them for the benefit, use, education, and inspiration of present and future generations. Title VII of the Act resulted in 2,592,600 acres or about 32 percent of the Chatham Administrative Area (which includes Analysis Area 6) becoming wilderness. Another 17,200 acres became nonwilderness National Monument. Title VIII of the Act addressed the use of public lands for subsistence uses; the customary and traditional uses by rural Alaska residents of wild, renewable resources. In addition, Section 705(a) of the Act provided funding to maintain a timber supply from the Tongass National Forest of 4.5 billion board feet per decade.

The enactment of ANILCA and ANCSA changed the status of land administration in the Tongass National Forest. The Record of Decision for the 1981-86 Operating Period Plan was signed April 11, 1980 with an implementation date of January 1, 1981. The Court case *Tenakee Springs v. Courtright* challenged the adequacy of the Final EIS for the 1981-86 Operating Plan. In a Memorandum and Order (June 26, 1987) the Court concluded that the EIS for the 1981-86 Operating Period required supplementation because of the following issues:

1. Since preparation of the FEIS for the 1981-86 Operating Period, actions related to ANCSA have resulted in the deletion or deferral of harvest units, thereby changing the Operating Plan.

Upper Game Creek





Setting a Choker on a Log to be Yarded to a Landing

2. Consideration of a no-action alternative specific to Upper Game Creek (Chichagof Island) is required.
3. Inadequate site-specific detail was provided regarding environmental effects of alternate road and harvest configurations in the Upper Game Creek area.
4. Additional analysis in the Upper Game Creek area may be necessary if land conveyances to Native Corporations change the management practices on neighboring lands, and consideration is necessary of the foreseeable cumulative impacts on the environment due to a steadily expanding network of roads and harvest units in the vicinity of Upper Game Creek.

In the Memorandum and Order, the Court required the preparation of a supplement to the FEIS for the 1981-86 Operating Period to improve the site-specific analysis of the Upper Game Creek area and address the other issues raised. The Court prohibited road construction and logging operations in that area pending completion of the supplemental analysis.

A Settlement Agreement in the *Tenakee Springs v. Courtright* case was filed April 20, 1988. As a part of the Settlement Agreement the Forest Service agreed to prepare a supplement to the EIS for the 1981-86 Operating Period. The Settlement Agreement deferred road construction and timber harvest in certain areas (deferred areas) and authorized activities to proceed in other areas (nondeferred areas) without further consideration in the supplement.

The Forest Service published a Notice of Intent in the Federal Register on October 15, 1987, to announce the preparation of a supplement to the FEISs for both the 1981-86 and 1986-90 Operating Periods. The issues identified by the Court and other issues of concern to the Plaintiffs in the *Tenakee Springs v. Courtright* lawsuit not only pertain to the FEIS for the 1981-86 Operating Period, but extend to areas included in the FEIS for the 1986-90 Operating Period, since many of the same timber-harvest areas were analyzed in both FEISs and many

of the same issues were addressed in each Operating Period. There was a need to further address the issues pertaining to both the 1981-86 and 1986-90 Operating Period FEISs because of new information and circumstances. For example, the Court identified Upper Game Creek as requiring more site-specific analysis, analysis of a no-action alternative, and discussion of foreseeable cumulative effects. However, the same arguments can apply to any similar geographic unit or local project. Therefore, the Notice of Intent stated that the Supplement process will evaluate a no-action alternative specific to each drainage or similar geographic area and will include the following three issues:

1. Additional analysis will be conducted on site-specific and cumulative environmental impacts associated with alternative road and timber harvest configurations included in the 1981-86 and 1986-90 Operating Plans (equivalent to the Court decision requirements for Upper Game Creek).
2. Analysis will be conducted of the effect on subsistence resources and uses in relation to alternatives considered in the SEIS pursuant to Section 810 of ANILCA. (Subsistence was not separately considered in the 1981-86 FEIS because ANILCA was enacted after approval of that EIS. Subsistence was analyzed in the 1986-90 FEIS.)
3. Mitigation measures will be developed and evaluated for the alternatives considered in the SEIS.

The Phase I Draft SEIS was issued for review in August of 1988. Comments received are addressed in the Supplement process and are responded to in the Final SEIS as are the comments that have been received for the Phase II Draft SEIS.



1 Purpose and Need

On July 31, 1988, several residents of Hoonah, Alaska, and others filed a lawsuit (*Hanlon v. Barton*) challenging the adequacy of the 1986-90 Plan FEIS with respect to activities planned near Hoonah. They claimed that activities proposed in the 1986-90 Operating Plan would significantly restrict subsistence uses, that evaluations of environmental and subsistence values were not site-specific, that the Forest Service must evaluate cumulative subsistence impacts of reasonably foreseeable future actions, that the Forest Service failed to consider a no-action alternative, and that there was a failure to evaluate impacts of "carryover" logging and road construction. On November 14, 1988, the Court denied a motion for preliminary injunction, but recognized the merit of some claims. Three of these claims have implications for Analysis Area 6; consideration of a no-action alternative, consideration of carryover logging and road construction, and subsistence evaluations.

The 101st Congress is considering legislation known as the "Tongass Timber Reform Act". The House of Representatives passed H.R. 987 on July 13, 1989, and the Senate is reviewing a similar bill, S.B. 346, at the time of this writing. As passed by the House of Representatives, that legislation would cancel the long-term timber sale contracts with the Alaska Pulp Corporation and the Ketchikan Pulp Company. It would also require "a buffer zone of a minimum of 100 feet in width within which logging shall be prohibited on each side of all anadromous fish streams in the Tongass National Forest, and their tributaries with no resident fish populations which are intermittent in flow, or have flow of inadequate magnitude to directly influence downstream fish habitat." Other provisions of this bill include prohibiting a road connection between the Indian River and Game Creek road systems, certain other management directions, and designation of 23 additional areas as wilderness. Six of the 23 areas are within the APC long-term contract area. The proposed Kadashan Wilderness and the proposed Trap Bay Wilderness are within Analysis Area 6.

Forest Service Recreation Cabin at Kook Lake



Management of the Analysis Area

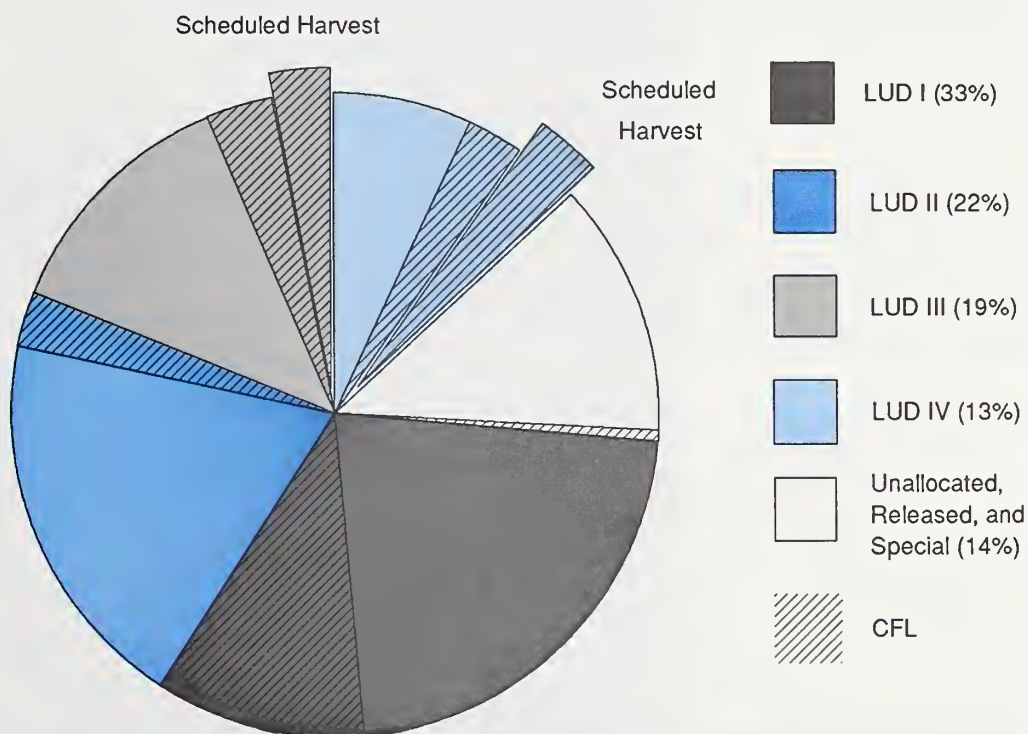
As previously stated, this document is the Phase II SEIS for Analysis Area 6, which is located on Chichagof Island. Analysis Area 6 is approximately 170,607 acres in size and is administered by the Chatham Area Office of the Tongass National Forest in Sitka. It includes two management areas and 11 VCUs as designated in the current Tongass Land Management Plan (Forest Service 1986d) as follows:

- Kadashan Management Area C36: VCU 235 (LUD III)
- Corner Bay Management Area C37: VCUs 236, 237, 238, 240, 241, 242, 243, 244, and 245 (LUD IV) and VCU 239 (LUD III).

The current Tongass Land Management Plan (Forest Service 1986d) divided the forest land into four Land Use Designations (LUDs) and defined the purposes and management implications of each. Areas designated as LUD I were suitable for recommendation for inclusion in the National Wilderness System and are managed as such. Land Use Designation II areas are generally maintained in a roadless state, but with fewer restrictions than LUD I lands. No commercial timber harvest is allowed on either LUD I or LUD II lands. The LUD III designated areas are managed for both amenity values (e.g., scenic and recreational uses) and commodity-oriented uses (e.g., timber harvest) in a compatible manner to provide the greatest combination of benefits. Such areas usually have high values of both types. The lands

Figure 1-6

Distribution of Land Use Designations (LUDs), Commercial Forest Land, and Scheduled Timber Harvest¹ in the Chatham Area²



¹ Scheduled timber harvest refers to Tongass Land Management Plan projections for the whole crop rotation.

² From the current Tongass Land Management Plan (Forest Service 1986d)

1 Purpose and Need

designated as LUD IV provide opportunities for intensive development of resources. These areas are managed in favor of commodity production (e.g., timber production) while protecting the long-term physical and biological productivity. The relative distribution of these LUDs in the Chatham Area is illustrated in Figure 1-6.

The current Tongass Land Management Plan designated the Kadashan Management Area (C36) as a LUD III area. The management direction or emphasis specified in the Plan is to continue road building and timber sale preparation and to continue fish, wildlife, and water monitoring and enhancement programs that are already underway. Beach log and blowdown harvest are emphasized.

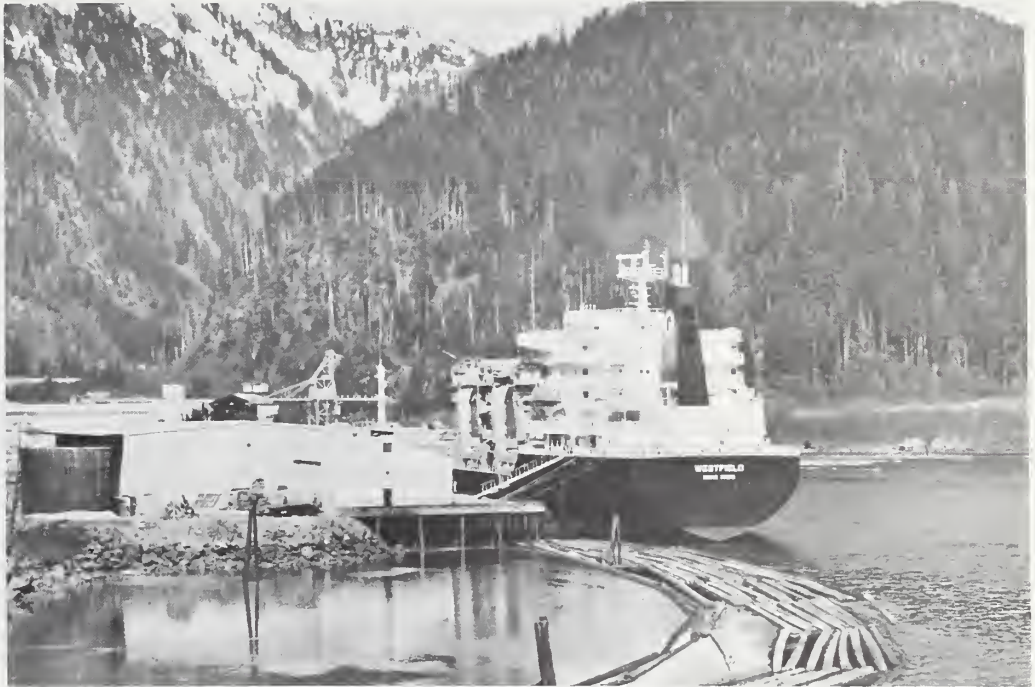
The Corner Bay Management Area (C37) is mostly designated as LUD IV. One VCU (239) is designated as LUD III. The management direction in the current Tongass Land Management Plan includes road construction and the maintenance of facilities related to timber harvest. Fish and wildlife enhancement projects, recreation, and research will continue. Beach log and blowdown harvest are emphasized.

The management decisions that are being considered in this SEIS fit within the framework of the management guidelines set forth in the most recent version of the Tongass Land Management Plan. In ANILCA, Congress authorized funding to provide for 4.5 billion board feet of sawlog volume to be made available from the Tongass National Forest per decade. According to TLMP data (Forest Service 1986d, pg. 5), the Chatham contribution to meeting ANILCA volume is 120.6 million board feet per year. The Management Areas where timber may be harvested have been established in TLMP. As illustrated in Figure 1-6, TLMP includes 54 percent of the Chatham Area as wilderness or roadless area, and an additional 13 percent is being managed so as not to preclude such designation in the future. Within the Chatham Area, about 16 percent of the LUD III lands and 25 percent of the LUD IV lands are sched-

*Kadashan Road Extending
into Kadashan River
Watershed*



Ship Being Loaded, APC
Pulp Plant, Sitka, Alaska



uled for timber harvest on a 100- to 120-year timber crop rotation. Analysis Area 6 contains about 2.1 percent of the land area of the Chatham Administrative Area, about 11.4 percent of the LUD IV lands, and about 3.4 percent of the LUD III lands of the Chatham Area. No LUD I or LUD II lands occur within the Analysis Area. All the proposed timber harvest in Analysis Area 6 would be in LUD III or LUD IV areas designated by TLMP for commodity production.

Purpose and Need

Federal action is required to provide the volume of timber needed to satisfy contractual obligations with APC until December 31, 1990, and to assure a smooth transition to future timber harvest activities. The range of sawlog volume needed within Analysis Area 6 to meet this obligation was discussed in the Phase I Draft SEIS (Chapter 2, page 32) as 80 to 90 million board feet (MMBF) of timber, 19.6 MMBF of which was available, at the time of the Phase I analysis, from nondeferred VCUs. All of the 19.6 MMBF is expected to be harvested by the end of the 1989 logging season.

The contents of this Phase II SEIS document respond to the issues identified in the *Tenakee Springs v. Courtright* Memorandum and Order and the Settlement Agreement and further address the environmental effects associated with meeting contractual obligations of timber volume to APC from Analysis Area 6. The results of the Phase II analysis were presented in the Draft SEISs for review and comment. This Final SEIS responds to public and agency comments. The FEISs for the 1981-86 and 1986-90 Operating Periods and the SEIS documents (Phase I and II Drafts and Final SEIS) serve as a basis for the selection of a preferred alternative and the Regional Forester's Record of Decision.

To formulate a Record of Decision, the Regional Forester must decide:

- if the changes in land ownership, deferrals, deletions, or changes of timber-harvest units, and the effects of ANILCA subsistence legislation warrant modifying the Records of Decision for the 1981-86 or 1986-90 FEISs,

1 Purpose and Need

Brown Bear Fishing for Salmon



- if the contractual timber commitments between the date of publication of the Draft Supplement and December 31, 1990 (end of the 1986-90 Operating Period) should be met from nondeferred VCUs (236, 239, 241, 242, 243, 244, and 245) that have some existing access roads and harvest units, and
- if the contractual commitments are not met from these nondeferred VCUs, how much additional timber will be needed and from which VCUs the timber harvest will be scheduled.

Public Involvement

Issues addressed in this document were identified from the results of the public involvement programs for the 1981-86 and 1986-90 FEISs (Forest Service 1980a, 1986b), the issues identified by the Court in *Tenakee Springs v. Courtright* (1987), the issues identified in the Notice of Intent to prepare the Supplemental EISs (Barton 1987), and from comments on the Draft SEIS. Additional scoping of issues was not undertaken prior to beginning the Supplement process; however, the possibility of currently pending national legislation for the Tongass National Forest is addressed.

All comments received during the Supplement process are considered and become part of the record. Review comments have been received on the Phase I Draft SEIS and on the Phase II Draft SEIS. Subsistence hearings provided additional opportunities for public response to subsistence issues related to SEIS alternatives. The Forest Service held subsistence hearings during the comment period on the Draft SEIS in eleven subsistence communities. Comments received in the subsistence hearings are part of the hearing record (Consolidated Appendix, Volume I, B). Comments received after the hearings relating to subsistence are considered as comments to the Draft SEIS. Such comments were analyzed and evaluated in the Final SEIS along with the other responses to the Draft SEIS (Consolidated Appendix, Volume II, C).

Issues

The issues that were identified by the Court in *Tenakee Springs v. Courtright* and the issues identified in the Notice of Intent are provided in the Background section above. In addition,

some issues addressed in the 1981-86 and 1986-90 FEISs must be evaluated in the Supplement. The following section summarizes the issues carried forward from the 1981-86 and 1986-90 FEISs (including appeals issues), identifies which aspects of the issues will be addressed, and lists the issues outside the scope of the SEIS. The management concerns and management opportunities addressed in the 1986-90 FEIS are addressed within the issues and analysis in this SEIS.

Issues Described in the 1981-86 and 1986-90 FEISs

Issue 1:

Socioeconomic Effects of Logging and Associated Development. This issue reflects public concern about effects on community employment, business, and population and on lifestyles and quality of life. Each of these aspects are addressed in this SEIS.

Issue 2:

Costs and Benefits. This issue refers to the trade-offs between environmental protection measures and the economics of the harvest activities. The SEIS alternatives are compared on the basis of factors that affect harvesting and management costs and various benefits.

Issue 3:

Effects of Timber Harvesting and Related Activities on Fish Habitat. The fishing industry is the largest industry in Southeast Alaska. There is high public concern that timber harvesting not be allowed to reduce salmon production. The Forest Service applies extensive and stringent standards and guidelines on roads and timber harvest to prevent such impacts. This issue is addressed in this SEIS and also evaluated as it relates to socioeconomics and subsistence issues.

Culvert Installation, Kadashan Road



Issue 4:

Effects of Timber Harvest and Related Activities on Wildlife Habitat. This issue includes concern over several notable wildlife species and the habitats most important to them. Much of the old-growth habitat with perceived high value to wildlife is also high volume timber. This SEIS evaluates the effects on important wildlife and wildlife habitat. This issue is closely related to the subsistence effects issue.

Issue 5:

Distribution of Harvest Volume Classes. This issue spans the concern that harvesting too many high-volume stands will unduly affect fish and wildlife habitat and, alternatively, that high-volume stands are the only stands that can be economically harvested to maintain a viable industry. Both aspects of this issue are addressed in this SEIS.

Issue 6:

Log Transfer Facility Locations and Environmental Effects. The issue of the placement of log transfer facilities includes concerns about effects on marine organisms, recreation, subsistence, and commercial fisheries. These concerns are addressed in this SEIS.

Issue 7:

Maintaining Resource Values in High Interest Areas. Certain areas were recognized during the 1986-90 FEIS process as "high-interest" areas because of noted fisheries, wildlife, recreational, wilderness, or other values expressed by agencies, groups, and individuals.

Analysis Area 6 has several high interest areas. The DEIS for the 1986-90 Operating Period addressed how resource values in high interest areas would be maintained. Within Analysis Area 6, VCU 235 (Kadashan) is listed as a high interest area because the Alaska Department of Fish and Game, the Southeast Alaska Conservation Council (SEACC), and other groups commented in the FEIS about its fisheries and wildlife values.



1986-90 Administrative Appeal Issues

Issue 8:

Effects on Visual, Recreational, and Wilderness Resources. This issue concerns a specific desire to maintain the primitive character of many areas in Southeast Alaska because of values other than for timber. This issue is addressed in the evaluation of alternatives in this SEIS.

After the Record of Decision (ROD) for the 1986-90 Operating Period FEIS was signed by the Regional Forester, there were eight separate administrative appeals of the decision. Five of these appeals are awaiting review and decisions by the Chief of the Forest Service. At least one of the appeals states that the Environmental Impact Statement does not comply with the:

- National Environmental Policy Act (NEPA)
- National Forest Management Act (NFMA)
- Alaska National Interest Lands Conservation Act (ANILCA)
- Resources Planning Act (RPA)
- National Historical Preservation Act (NHPA)

Concerns covered such subjects as: subsistence, Native cultural existence, wildlife habitat, wildlife populations, habitat for finfish and shellfish, bald eagle nest trees, feeding and nesting habitat for various species, and harvest of deer and bear. There were concerns expressed that the 1986-90 Planning Process, in a variety of ways, failed to consider reasonable alterna-

*Kadashan Road Looking
Toward Kadashan Bay*



tives; failed to assess long-term and cumulative impacts; inadequately discussed environmental impacts; failed to demonstrate effectiveness of and intent to implement mitigation measures; and failed to display adequate site-specific information.

The concerns expressed in the appeals were reviewed and considered by the IDT. A more detailed summary of Statements of Reasons presented in these appeals can be found in Consolidated Appendix, Volume III, G.

Issues Outside the Scope of this SEIS

The issues addressed in this SEIS document are those issues identified in the Phase I Draft SEIS. They include the issues required by the Court and issues from the 1981-86 and 1986-90 FEISs that are being reanalyzed.

Issues identified as being outside the scope of the 1986-90 FEIS included:

1. Can the harvest supply target of 4.5 billion board feet of timber per decade for the Tongass National Forest be lowered?
2. Can the Tongass Land Management Plan land use designations be changed?
3. Can the APC Contract be cancelled, bought out, or renegotiated?

These issues are also considered outside the scope of this SEIS (see Consolidated Appendix, Volume III, F).

One issue that was considered outside the scope of the 1986-90 FEIS, but which is addressed in the SEIS is the reasonably foreseeable cumulative effects during the life of the APC Long-Term Timber Sale Contract (through the year 2011). The 1986-90 FEIS used a longer planning horizon to predict long-term environmental effects (to 2080). The Supplement evaluates effects to 2011, the end of the APC contract, as being reasonably foreseeable, and tiers to the 1986-90 Plan evaluation for longer term forecasts.

Permits and Licenses

To proceed with the timber harvest as addressed in the SEIS, permits from other agencies must be obtained. Administrative actions on these permits would take place 30 days after the Final SEIS is filed with the Environmental Protection Agency. The agencies and their responsibilities are listed below.

US Army Corps of Engineers:

- Approval of discharge of dredged or fill materials into the waters of the United States under Section 404 of the Clean Water Act.
- Approval of construction of structures or work in navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899.

Environmental Protection Agency:

- National Pollutant Discharge Elimination System Review (Section 402 of the Clean Water Act)

State of Alaska, Department of Natural Resources:

- Tideland Permit and Lease or Easement

State of Alaska, Department of Environmental Conservation:

- Solid Waste Disposal Permit
- Certification of compliance with Alaska Water Quality Standards (Section 401 of the Clean Water Act)

United States Coast Guard:

- Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed within the tidal influence zone

Major Legislation Relating to the EIS:

- National Environmental Policy Act of 1969 (as amended)
- Forest and Rangeland Renewable Resources Planning Act of 1974
- National Forest Management Act of 1976
- Clean Water Act of 1977

Coastal Zone Management Act of 1976 (CZMA)

- The Alaska Coastal Management Program (ACMP) developed under CZMA contains the standards and criteria for a determination of consistency for activities within the coastal zone. Although Federal lands are excluded from the Coastal Zone, the Coastal Zone Management Act of 1976 requires Federal agencies conducting activities or undertaking development directly affecting the coastal zone to ensure that the activities or developments are consistent with approved State management programs to the maximum extent practicable. The alternatives have been evaluated by the Forest Service against the applicable provisions (Timber Harvest and Processing, 6 AAC 80.100) of the ACMP and found to be consistent to the maximum extent practicable.

*Construction Affecting
Streams - Allowed Only
When the Potential to Impact
Fish Will be Minimal*



Chapter 2

Alternatives Including the Proposed Action



Chapter 2

Alternatives Including the Proposed Action

In Chapter 1, the background, issues, concerns, and opportunities associated with the decisions on the Operating Plans for the APC Long-Term Timber Sale Contract for Analysis Area 6 were described. Chapter 2 describes the alternatives that were developed to resolve those issues and concerns, and summarizes the environmental consequences of each alternative described in detail in Chapter 4 of this document.

The management objectives and criteria used to formulate the alternatives are discussed below. Following that, the alternatives initially considered, but eliminated from detailed evaluation, are described. Then, the alternatives being evaluated in this document are described and compared in terms of their environmental consequences, their effectiveness in meeting the contract needs, and the management opportunities each offers. Chapter 2 concludes with a discussion of applicable standards, guidelines, and mitigation measures.

*Road Construction, North
of Kook Lake, 1988*



Formulation of Alternatives

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations to implement NEPA (40 CFR 1502.14) require that a range of reasonable alternatives, including a no-action alternative, be evaluated for projects requiring an EIS. The alternatives were formulated in response to the issues, concerns, and opportunities described in Chapter 1 of this supplement. They tier to the alternatives considered in Chapter 2 of the Phase I Draft SEIS (Forest Service 1988a). Constraints considered during alternative development include (1) the SEIS time frame (until the end of the APC 1986-90 Operating Period), (2) the time needed to obtain permits for and complete construction of log transfer facilities, and (3) the time required to construct roads for access to harvest units in Analysis Area 6. The need to protect resources by dispersing harvest activities geographically as well as through time was also a consideration in the formulation of the alternatives. This meant that some stands of timber that were accessible and available for harvest were not considered for harvest in this SEIS so as to not compound the effects on visual, soil, water, and fishery resources of recent nearby harvests. A total of seven alternatives, including the No Action Alternative, were developed and evaluated for Analysis Area 6.

The Interdisciplinary Team used the following management objectives as guidance in responding to the issues described in Chapter 1 to formulate the alternatives. All alternatives were designed in compliance with applicable Forest Service Manual and Handbook direction and would meet Federal, State, and local laws and regulations.

- Implement the Tongass Land Management Plan (TLMP).
- Design Land Management activities to minimize potential for causing landslides.
- Maintain floodplain stability.
- Meet State Water Quality standards especially with reference to sediment.
- Ensure cost effective means of project implementation.
- Plan, develop, and operate a network of transportation modes that provide for user safety, convenience, and efficiency to accomplish land and resource management objectives.
- Meet contractual obligations with Alaska Pulp Corporation.
- Protect eagle nesting and roosting habitats.
- Meet or exceed the acres of wildlife habitat projected in TLMP for Analysis Area 6.
- Protect anadromous fish stocks and maintain the productivity of fish habitat.
- Minimize risk of blown down trees.
- Manage scenery using the visual guidelines approved in TLMP.
- Provide for continued subsistence use opportunities.



*Historic A-frames Used to
Yard Logs*

Alternatives Considered But Eliminated From Detailed Study

During the development of alternatives, several alternatives were initially considered, but for various reasons were not fully developed or analyzed, and were eliminated from further detailed study.

Alternatives eliminated from detailed study in the Phase I SEIS, including those from the 1981-86 and 1986-90 FEISs, are not repeated in this document. Additional discussion of alternatives eliminated in the Phase I Draft SEIS (Forest Service 1988a) is included in

Consolidated Appendix, Volume III, F. It should be noted that a given harvest unit can be considered for harvest in more than one alternative. Therefore, elimination of an alternative does not necessarily remove the individual harvest unit from further consideration. Listed below are the alternatives eliminated from further consideration along with an explanation of why they were eliminated.

- A. One alternative was eliminated because it was essentially the same as Alternative 1, the No Action Alternative. Prior to the *Hanlon v. Barton* settlement agreement, this alternative eliminated all further harvest in VCUs 237 and 238. The only harvest allowed was in nondeferred VCUs 236 and 239. Another alternative was eliminated because it only picked up the deferred volume in VCUs 237 (10.7 MMBF) and 238 (26.1 MMBF). This volume (36.8 MMBF) alone was not enough to meet the volume requirements projected in Phase I (50 to 70 MMBF). This alternative's volume was incorporated into Alternative 4.
- B. Phase I of the Draft SEIS stated in Chapter 2 (Forest Service 1988a, p.34) that the 1986-90 Alternatives A through J would have low priority for consideration in the Phase II Draft SEIS. None of the previous alternatives, including the Record Of Decision, could be completed, as planned, within the SEIS time frame due to logistical and time constraints on road construction and harvest operations.

Alternatives Evaluated in this EIS

Alternative 1: No Action - Current Direction and No Further Harvest

Alternative 1 is the No Action Alternative required by NEPA. The DEIS defined the No Action Alternative as "no change in the current direction". For Analysis Area 6, this alternative was to permit the activities currently authorized by the Court to continue. It was assumed that all harvest and road construction would be completed by the release of the ROD. However, at the time of the FEIS formulation, three unharvested units remain in Analysis Area 6 (unit 10 in VCU 236 and units 6 and 7 in VCU 239, all of which are displayed in Table 2-1). There is currently no harvest activity in this area. Therefore, it is unlikely that these units will be harvested by the time the ROD is released. In the Draft SEIS, the No Action Alternative had the same effect as a No Further Harvest alternative, because all harvest units were expected to be harvested, so these alternatives were presented together. Since three units were not harvested, these alternatives will no longer have the same effect. With no change in current direction, Alternative 1 would allow harvest of the three units authorized by the Court and associated road construction in Analysis Area 6 to continue through the end of the 1986-90 Operating Period.

Table 2-1
Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 1

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
236	10	2,080	125	3	0	0	128	16.2
239	6	336	21	0	0	0	21	16.0
	7	3,230	14	113	0	0	127	25.4
VCU Total		3,566	35	113	0	0	148	20.7
Total for All VCUs		5,646	160	116	0	0	276	18.5

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

2 Alternatives

A No Further Harvest decision would stop all presently approved road construction and timber harvest activities in Analysis Area 6 and would propose no additional harvest activities through the balance of the 1986-90 Operating period. If implemented, a No Further Harvest Decision would stop future timber harvesting and road building activities until another Environmental Impact Statement and Record of Decision approve continuance of activities.

Implementation of Alternative 1 in either form would have a high probability of causing the Forest Service, as representative of the United States Government, to breach contractual obligations to APC because of inability to substitute volume in other parts of the APC Contract area within the time frame of the Supplement.

Alternative 1 serves as a basis of comparing the environmental effects of the action alternatives and their effectiveness in meeting Contract requirements and management objectives.

Alternative 2

Alternative 2 proposes no activities in Court deferred VCUs 235, 237, and 238. Instead, this alternative proposes the harvest of 53.0 MMBF of timber on 2,472 acres in 31 harvest units in VCUs 236, 239, 242, and 243. This alternative also includes three unharvested units remaining from Alternative 1, as shown in Table 2-1. The average harvest unit would be 77 acres, and 26.7 miles of road would be constructed to provide the needed access. Seven percent of the volume (3.3 MMBF) or 8 percent of the acres would be harvested by skyline systems under this alternative. The Corner Bay Camp and log transfer facility would be used for VCUs 236 and 239. The False Island Camp and either the False Island or Sitkoh Bay LTF would be used for VCUs 242 and 243. The existing Kadashan Road would not be extended to connect the Corner Bay road system to the False Island road system under this alternative.

Table 2-2 presents the acres and volume of timber harvest proposed in Alternative 2. The proposed and existing harvest units and roads are displayed on the Alternative map folded at the back of this document.

Wrangell Mill



Table 2-2

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 2

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
236	10	2,060	125	3	0	0	128	16.2
	31	1,330.0	0	50	0	0	50	26.6
	38	1,620.0	68	20	0	0	88	18.4
	39	1,520.0	95	0	0	0	95	16.0
	40	2,438.8	35	28	35	0	98	24.9
	41	1,007.0	38	15	0	0	53	19.0
	47	931.0	0	35	0	0	35	26.6
	49	1,143.8	0	43	0	0	43	26.6
VCU Total		12,070.0	361	194	35	0	590	20.5
239	6	336	21	0	0	0	21	16.0
	7	3,230	14	113	0	0	127	25.4
	17	3,325.0	0	125	0	0	125	26.6
	59	2,022.0	0	76	0	0	76	26.6
VCU Total		5,347.0	35	314	0	0	349	25.6
242	94	2,024.0	60	40	0	0	100	20.2
	95	2,024.0	60	40	0	0	100	20.2
	96	2,101.0	0	79	0	0	79	26.6
	218	1,737.0	67	25	0	0	92	18.9
VCU Total		7,886.0	187	184	0	0	371	21.2
243	105	1,944.0	55	40	0	0	95	20.5
	106	1,268.0	56	14	0	0	70	18.1
	108	2,109.0	50	49	0	0	99	21.3
	109	1,256.0	28	28	0	0	56	21.2
	111	2,931.8	12	103	0	0	115	25.5
	112	1,720.4	51	34	0	0	85	20.2
	113	740.2	18	17	0	0	35	21.1
	114	2,268.0	42	60	0	0	102	22.2
	115	1,565.2	28	42	0	0	70	22.4
	129	910.8	27	18	0	0	45	20.2
	130	1,120.0	70	0	0	0	70	16.0
	201	2,445.2	48	46	14	0	108	22.6
	202	565.4	13	11	2	0	26	21.7
	203	1,422.6	54	21	0	0	75	19.0
	204	1,913.8	98	13	0	0	111	17.2
VCU Total		24,112.0	650	496	16	0	1,162	20.8
Total for All VCUs		52,981.0	1,233	1,188	51	0	2,472	21.4

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

2 Alternatives

Alternative 3

Alternative 3 also defers harvest in VCUs 235 and 237. This alternative proposes harvest of about 68.1 million board feet on 3,036 acres (75 units) in VCUs 236, 238, 239, 242, and 243. This alternative proposes construction of 31 miles of road for an average of 2.0 MMBF/mile. The Corner Bay LTF would be renovated for use and the Corner Bay logging camp would be used for harvest in VCUs 236, 238, and 239. This alternative includes about 22 million additional board feet to be harvested in VCUs 242 and 243. The Sitkoh Bay or False Island Log Transfer Facilities would be renovated and the False Island logging camp would be reactivated and expanded and used for these VCUs. The existing Kadashan Road would not be extended to the False Island road system under this alternative. This alternative also includes the three unharvested units from Alternative 1.

Table 2-3 presents the acres and volume of timber harvest proposed in Alternative 3. The proposed and existing harvest units, roads, and log transfer facility are illustrated on the Alternative map folded at the back of this document.

Trap Bay and Tenakee Inlet



Table 2-3
Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 3

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
236	10	2,060	125	3	0	0	128	16.2
	31	1,330.0	0	50	0	0	50	26.6
	38	1,620.0	68	20	0	0	88	18.4
	39	1,520.0	95	0	0	0	95	16.0
	40	2,438.8	35	28	35	0	98	24.9
	41	1,007.0	38	15	0	0	53	19.0
	47	931.0	0	35	0	0	35	26.6
	49	1,143.8	0	43	0	0	43	26.6
	VCU Total	12,070.0	361	194	35	0	590	20.5
238	7	587.0	14	10	3	0	27	21.7
	8	1,214.0	0	3	35	0	38	31.9
	9	2,501.0	30	65	9	0	104	24.0
	10	3,144.0	13	86	20	0	119	26.4
	11	974.0	11	30	0	0	41	23.8
	12	420.0	4	0	11	0	15	28.0
	13	1,483.0	13	26	18	0	57	26.0
	14	1,552.0	35	30	6	0	71	21.9
	15	1,916.0	10	66	0	0	76	25.2
	16	1,569.0	0	59	0	0	59	26.6
	17	1,389.0	7	48	0	0	55	25.3
	18	352.0	22	0	0	0	22	16.0
	19	890.0	44	7	0	0	51	17.5
	20	1245.0	3	45	0	0	48	25.9
	21	624.0	34	3	0	0	37	16.9
	22	920.0	1	34	0	0	35	26.3
	23	2,336.0	146	0	0	0	146	16.0
	24	1,217.0	13	16	18	0	47	25.9
	25	194.0	0	0	6	0	6	32.3
	91	644.0	12	17	0	0	29	22.2
	101	408.0	3	5	7	0	15	27.2
	VCU Total	25,579.0	415	550	133	0	1,098	23.3
239	6	336.0	21	0	0	0	21	16.0
	7	3,230.0	14	113	0	0	127	25.4
	17	3,325.0	0	125	0	0	125	26.6
	59	2,022.0	0	76	0	0	76	26.6
	VCU Total	8,913.0	35	314	0	0	349	25.5

(Continued)

2 Alternatives

Table 2-3 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 3

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
242	94	2,024.0	60	40	0	0	100	20.2
	95	2,024.0	60	40	0	0	100	20.2
	96	2,101.0	0	79	0	0	79	26.6
	218	1,737.0	67	25	0	0	92	18.9
	VCU Total	7,886	187	184	0	0	371	21.3
243	105	1,944.0	55	40	0	0	95	20.5
	106	1,268.0	56	14	0	0	70	18.1
	109	1,193.0	28	28	0	0	56	21.3
	111	2,931.8	12	103	0	0	115	25.5
	112	1,720.4	51	34	0	0	85	20.2
	113	740.2	18	17	0	0	35	21.1
	114	2,268.0	42	60	0	0	102	22.2
	115	1,565.2	28	42	0	0	70	22.4
	VCU Total	13,631	290	338	0	0	628	21.7
Total for All VCUs		68,079.0	1,288.0	1,580	168	0	3,036	22.4

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

Alternative 4

One of the objectives of Alternative 4 is to utilize the investment made in the existing Kadashan Road with an extension into the False Island road system. It assumes that all Court deferred VCUs in Analysis Area 6 are available for entry. This alternative proposes to harvest about 67.5 MMBF on 3,008 acres in 88 harvest units. This includes the 1986-90 Record of Decision approved 32 MMBF in deferred VCUs 237 and 238. An additional 26 MMBF is proposed in VCUs 242, 243, and 244. Ninety-four percent of the harvest would be by high-lead systems, and the remaining 6 percent would be by skyline systems. This alternative includes three unharvested units from Alternative 1.

This alternative includes proposed harvest in VCU 237. This VCU is currently being considered for Wilderness designation under H.R. 987 (the Tongass Reform Act). Passage of this legislation would reduce the volume available for harvest in this alternative by 10,671 MBF.

Thirty-seven miles of road would be constructed for access to 43 units, for an average of 2.0 MMBF/mile. As an alternative to the reopening of the Sitkoh Bay LTF, this Alternative proposes connecting the Kadashan Road to the False Island road system. The Sitkoh Bay LTF would not be reopened. With the completion of the Kadashan Road, the Corner Bay camp and renovated log transfer facility would be used. No timber harvest with the exception of road right-of-way is proposed in Kadashan (VCU 235) by this Alternative. Table 2-4 presents the acres and volume of timber harvest proposed in Alternative 4. The proposed and existing harvest units, roads, and log transfer facilities are illustrated on the Alternative map folded in the back of this document.

Table 2-4
Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 4

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
236	10	2,060.0	125	3	0	0	128	16.2
	VCU Total	10,674.0	125	3	0	0	128	16.2
237 ²	26	1,118.0	10	36	0	0	46	24.3
	27	1468.0	40	31	0	0	71	20.7
	28	2654.0	39	41	29	0	109	24.3
	29	3034.0	4	12	81	0	98	30.9
	30	1091.0	15	32	0	0	47	23.2
	31	1309.0	14	14	22	0	50	26.2
	VCU Total	10,674.0	122	166	132	0	421	25.4
238	7	587.0	14	10	3	0	27	21.7
	8	1,214.0	0	3	35	0	38	31.9
	9	2,501.0	30	65	9	0	104	24.0
	10	3,144.0	13	86	20	0	119	26.4
	11	974.0	11	30	0	0	41	23.8
	12	420.0	4	0	11	0	15	28.0
	13	1,483.0	13	26	18	0	57	26.0
	14	1,552.0	35	30	6	0	71	21.9
	15	1,916.0	10	66	0	0	76	25.2
	16	1,569.0	0	59	0	0	59	26.6
	17	1,389.0	7	48	0	0	55	25.3
	18	352.0	22	0	0	0	22	16.0
	19	890.0	44	7	0	0	51	17.5
	20	1245.0	3	45	0	0	48	25.9
	21	624.0	34	3	0	0	37	16.9
	22	920.0	1	34	0	0	35	26.3
	23	2,336.0	146	0	0	0	146	16.0
	24	1,217.0	13	16	18	0	47	25.9
	25	194.0	0	0	6	0	6	32.3
	91	644.0	12	17	0	0	29	22.2
	101	408.0	3	5	7	0	15	27.2
	VCU Total	25,579.0	415	550	133	0	1,098	23.3
239	6	336.0	21	0	0	0	21	16.0
	7	3,230.0	14	113	0	0	127	25.4
	VCU Total	3,566.0	35	113	0	0	148	24.1

(Continued)

2 Alternatives

Table 2-4 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 4

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
242	94	2,024.0	60	40	0	0	100	20.2
	95	2,024.0	60	40	0	0	100	20.2
	96	2,101.0	0	79	0	0	79	26.6
	218	1,737.0	67	25	0	0	92	18.9
	VCU Total	7,886.0	187	184	0	0	371	21.3
243	105	1,944.0	55	40	0	0	95	20.5
	106	1,268.0	56	14	0	0	70	18.1
	108	2,103.0	50	49	0	0	99	21.3
	109	1,183.6	28	28	0	0	56	21.3
	111	2,931.8	12	103	0	0	115	25.5
	112	1,720.4	51	34	0	0	85	20.2
	113	740.2	18	17	0	0	35	21.1
	114	2,268.0	42	60	0	0	102	22.2
	115	1,565.2	28	42	0	0	70	22.4
	129	910.8	27	18	0	0	45	16.0
	130	1,120.0	70	0	0	0	70	20.2
	VCU Total	17,765.0	437	405	0	0	842	21.1
Total for All VCUs		67,553.0	1,321	1,421	266	0	3,008	22.5

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

² This VCU is being considered for Wilderness designation in H.R. 987.

Alternative 5

Alternative 5 would harvest timber and/or construct roads in VCUs 235, 236, 237, 238, 239, 240, 241, 242, 243, and 244. It would make timber available to continue operations at the Corner Bay LTF and logging camp for the remainder of the Operating Period. Enough volume would be available to make renovation of the False Island or Sitkoh Bay Log Transfer Facilities and location of a new operator at the False Island logging camp economically feasible. The Kadashan Road would not be connected in this alternative.

Alternative 5 proposes harvest of about 120.2 MMBF on 5,013 acres, 27 MMBF of which would be harvested from Court-deferred VCU 235, 36 MMBF from Court-deferred VCUs 237 and 238, and of 23 million in the Angoon selection in the Whiterock area (portions of VCUs 240 and 241). Harvest in the Whiterock area would be subject to concurrence by Sealaska Corporation. This alternative includes three unharvested units from Alternative 1.

Thirty-eight miles of road construction would be required for access to 110 harvest units for an average of 2.7 MMBF/mile of road. No skyline logging units are proposed in this alternative. All harvest would be by highlead systems.

This alternative includes proposed harvest in VCUs 235 and 237. Both of these VCUs are currently being considered for Wilderness designation under H.R. 987 (the Tongass Reform Act). Passage of this legislation would reduce the volume available for harvest in this alternative by 36,253 MBF.

Table 2-5 gives the acres and volume of proposed timber harvest for Alternative 5. The proposed and existing harvest units, roads, and log transfer facilities are illustrated on the Alternative map folded at the back of this document.

Table 2-5
Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 5

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
235 ²	235	3,854.2	63	107	0	0	170	22.7
	236	5,560.4	20	102	78	0	200	27.8
	237	2,875.0	55	75	0	0	130	22.1
	238	4,534.0	0	140	25	0	165	27.5
	239	3,852.8	35	30	77	0	142	27.1
	240	1,654.2	18	27	20	0	65	25.4
	241	4,346.8	8	10	122	0	140	31.0
	VCU Total	26,677.4	199	491	322	0	1,012	26.4
236	10	2,080.0	125	3	0	0	128	16.2
	VCU Total	2,080.0	125	3	0	0	128	16.2
237 ²	26	1,118.0	10	36	0	0	46	24.3
	27	1,468.0	40	31	0	0	71	20.7
	28	2,654.0	39	41	29	0	109	24.3
	29	3,034.0	4	12	81	0	98	30.9
	30	1,091.0	15	32	0	0	47	23.2
	31	1,309.0	14	14	22	0	50	26.2
	VCU Total	10,674.0	122	166	132	0	421	25.4
238	7	587.0	14	10	3	0	27	21.7
	8	1,214.0	0	3	35	0	38	31.9
	9	2,501.0	30	65	9	0	104	24.0
	10	3,144.0	13	86	20	0	119	26.4
	11	974.0	11	30	0	0	41	23.8
	12	420.0	4	0	11	0	15	28.0
	13	1,483.0	13	26	18	0	57	26.0
	14	1,552.0	35	30	6	0	71	21.9
	15	1,916.0	10	66	0	0	76	25.2
	16	1,569.0	0	59	0	0	59	26.6
	17	1,389.0	7	48	0	0	55	25.3
	18	352.0	22	0	0	0	22	16.0
	19	890.0	44	7	0	0	51	17.5
	20	1245.0	3	45	0	0	48	25.9

(Continued)

2 Alternatives

Table 2-5 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 5

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
238 (Cont.)	21	624.0	34	3	0	0	37	16.9
	22	920.0	1	34	0	0	35	26.3
	23	2,336.0	146	0	0	0	146	16.0
	24	1,217.0	13	16	18	0	47	25.9
	25	194.0	0	0	6	0	6	32.3
	91	644.0	12	17	0	0	29	22.2
	101	408.0	3	5	7	0	15	27.2
VCU Total		25,579.0	415	550	133	0	1,098	23.3
239	6	336.0	21	0	0	0	21	16.0
	7	3,230.0	14	113	0	0	127	25.4
	17	3,005.8	0	125	0	0	113	26.6
VCU Total		6,571.8	35	238	0	0	261	25.2
240	234	3,843.8	27	43	70	0	140	27.5
	VCU Total	3,843.8	27	43	70	0	140	27.5
241	225	885.0	47	5	0	0	52	17.0
	226	923.4	40	7	3	0	50	18.5
	227	591.8	32	3	0	0	35	16.9
	228	718.2	0	27	0	0	27	26.6
	229	964.8	47	8	0	0	55	17.5
	230	2,829.2	5	12	75	0	92	30.8
	231	2,090.8	3	50	22	0	75	27.9
	232	2,012.4	0	72	3	0	75	26.8
	233	1,250.2	0	47	0	0	47	26.6
	VCU Total	12,265.8	174	231	103	0	508	24.1
242	217	851.2	0	32	0	0	32	26.6
	218	1,737.0	67	25	0	0	92	18.9
	219	550.8	0	0	17	0	17	32.4
	220	992.0	62	0	0	0	62	16.0
	221	2,000.8	12	68	0	0	80	25.0
	222	2,926.0	0	110	0	0	110	26.6
	223	2,902.0	65	70	0	0	135	21.5
	224	883.8	17	23	0	0	40	22.1
	VCU Total	12,843.6	223	328	17	0	568	22.6

(Continued)

Table 2-5 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 5

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
243	205	1,913.8	98	13	0	0	111	17.2
	210	1,038.0	15	30	0	0	45	23.1
	213	1,943.0	30	55	0	0	85	22.9
	215	2,445.2	48	46	14	0	108	22.6
	216	1,038.0	15	30	0	0	45	23.1
	VCU Total	8,378.0	206	174	14	0	394	21.3
244	206	2,501.0	15	85	0	0	100	25.0
	207	2,077.2	60	42	0	0	102	20.4
	208	2,075.2	10	72	0	0	82	25.3
	209	1,890.0	35	50	0	0	85	22.2
	211	325.0	12	5	0	0	17	19.1
	212	2,080.8	17	68	0	0	85	24.5
	VCU Total	10,949.2	149	322	0	0	471	23.2
Total for All VCUs		120,184.0	1,675	2,546	792	0	5,013	24.0

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

² These VCUs are being considered for Wilderness designation in H.R. 987.

Alternative 6

Alternative 6 would harvest timber in the Kadashan VCU (VCU 235) and connect the Kadashan Road to the False Island road system. The Corner Bay LTF would be renovated for use and the Corner Bay logging camp would be used for all harvest under this alternative. Harvesting in wildlife and fish habitats in other VCUs in the Analysis Area would decrease as a result. Harvest approved in the 1986-90 Record of Decision is proposed for VCUs 237 and 238. This alternative includes the three unharvested units from Alternative 1.

Alternative 6 proposes the harvest of about 80.4 MMBF on 3,383 acres in VCUs 235, 236, 237, 238, 239, and 243. Nineteen MMBF of this total would be harvested from Court-deferred VCU 235 and 36 million from Court-deferred VCUs 237 and 238.

Forty-five miles of road construction would be required to access the 101 harvest units, for an average of 1.7 MMBF/mile of road. Twelve percent of the volume would be harvested by skyline systems and the remainder by highlead systems.

This alternative includes proposed harvest in VCUs 235 and 237. Both of these VCUs are currently being considered for Wilderness designation under H.R. 987 (the Tongass Reform Act). Passage of this legislation would reduce the volume available for harvest in this alternative by 36,253 MBF.

The acres and volume of proposed timber harvest for Alternative 6 are given in Table 2-6. The proposed and existing harvest units, roads, and log transfer facilities are illustrated on the Alternative map folded in the back of this document.

2 Alternatives



*Timber Harvesting in the
Sitkoh Bay Watershed*

Table 2-6

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 6

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
235 ²	43	1,391.0	15	25	15	0	55	25.3
	45	905.0	15	25	0	0	40	22.6
	46	720.0	45	0	0	0	45	16.0
	50	853.0	45	5	0	0	50	17.1
	51	752.0	0	10	15	0	25	30.1
	52	1,799.0	0	25	35	0	60	30.0
	53	1,463.0	0	55	0	0	55	26.6
	54	1,251.0	20	35	0	0	55	22.7
	64	2,302.0	0	50	30	0	80	28.8
	65	648.0	0	0	20	0	20	32.4
	66	486.0	0	0	15	0	15	32.4
	67	1,171.0	15	35	0	0	50	23.4
	68	972.0	0	0	30	0	30	32.4
	70	1,183.0	15	5	25	0	45	26.3
	77	2,524.0	25	36	36	0	97	26.0
	104	1,238.0	0	10	30	0	40	31.0
VCU Total		19,658.0	195	316	251	0	762	25.8

(Continued)

Table 2-6 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 6

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
236	10	2,080.0	125	3	0	0	128	16.2
	VCU Total	2,080.0	125	3	0	0	128	16.2
237 ²	26	1,118.0	10	36	0	0	46	24.3
	27	1,468.0	40	31	0	0	71	20.7
	28	2,654.0	39	41	29	0	109	24.3
	29	3,034.0	4	12	81	0	98	30.9
	30	1,091.0	15	32	0	0	47	23.2
	31	1,309.0	14	14	22	0	50	26.2
	VCU Total	10,674.0	122	166	132	0	421	25.4
238	7	587.0	14	10	3	0	27	21.7
	8	1,214.0	0	3	35	0	38	31.9
	9	2,501.0	30	65	9	0	104	24.0
	10	3,144.0	13	86	20	0	119	26.4
	11	974.0	11	30	0	0	41	23.8
	12	420.0	4	0	11	0	15	28.0
	13	1,483.0	13	26	18	0	57	26.0
	14	1,552.0	35	30	6	0	71	21.9
	15	1,916.0	10	66	0	0	76	25.2
	16	1,569.0	0	59	0	0	59	26.6
	17	1,389.0	7	48	0	0	55	25.3
	18	352.0	22	0	0	0	22	16.0
	19	890.0	44	7	0	0	51	17.5
	20	1245.0	3	45	0	0	48	25.9
	21	624.0	34	3	0	0	37	16.9
	22	920.0	1	34	0	0	35	26.3
	23	2,336.0	146	0	0	0	146	16.0
	24	1,217.0	13	16	18	0	47	25.9
	25	194.0	0	0	6	0	6	32.3
	91	644.0	12	17	0	0	29	22.2
	101	408.0	3	5	7	0	15	27.2
	VCU Total	25,579.0	415	550	133	0	1,098	23.3
239	6	336.0	21	0	0	0	21	16.0
	7	3,230.0	14	113	0	0	127	25.4
	VCU Total	3,566.0	35	113	0	0	148	20.7

(Continued)

2 Alternatives

Table 2-6 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 6

VCU	Harvest Unit	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
243	105	1,944.0	55	40	0	0	95	20.5
	106	1,449.6	64	16	0	0	80	18.1
	108	1,278.0	30	30	0	0	60	21.3
	109	1,762.6	42	41	0	0	83	21.2
	111	2,931.8	12	103	0	0	115	25.5
	129	910.8	27	18	0	0	45	20.2
	130	1,120.0	70	0	0	0	70	16.0
	200	1,038.0	15	30	0	0	45	23.1
	201	2,445.2	48	46	14	0	108	22.6
	202	565.4	13	11	2	0	26	21.7
	203	1,422.6	54	21	0	0	75	19.0
	204	1,913.8	98	13	0	0	111	17.2
	VCU Total	18,781.8	528	369	16	0	913	20.6
	Total for All VCUs	80,338.8	1,420	1,517	532	0	3,470	23.2

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

² These VCUs are being considered for Wilderness designation in H.R. 987.

Alternative 7

Alternative 7 proposes the harvest of 79.3 MMBF on 3,479 acres in VCUs 235, 236, 237, 238, 239, 242, 243, 244, and 245. Approximately 38 miles of road would be constructed to access 55 units for an average of 1.89 MMBF/mile of road, including the 17.2 miles of road proposed for Trap Bay in the 1981-86 and 1986-90 FEISs. The Sitkoh Bay and Todd Log Transfer Facilities would be renovated for use. The Corner Bay LTF (renovated) and logging camp and the False Island logging camp would also be used under this alternative.

This alternative emphasizes the protection of anadromous fish habitat, deer winter range, and other important wildlife habitat. This alternative would avoid harvest in important wildlife and fish habitat throughout Analysis Area 6 by scheduling timber harvest units and road construction in less sensitive areas. Alternative 7 redesigns all 1981-86 and 1986-90 ROD units in VCUs 237 and 238 and proposes harvest in Kadashan (VCU 235), but the Kadashan Road would not be connected.

This alternative includes proposed harvest in VCUs 235 and 237. Both of these VCUs are currently being considered for Wilderness designation under H.R. 987 (the Tongass Reform Act). Passage of this legislation would reduce the volume available for harvest in this alternative by 18,427.6 MBF.

The acres and volume of proposed timber harvest for Alternative 7 are given in Table 2-7. The proposed existing harvest units, roads, and log transfer facilities are illustrated in the Alternative map folded in the back of this document.

Table 2-7

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 7

VCU	Unit Number	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
235 ²	71	1,537.8	8	53	0	0	61	25.2
	72	1,378.0	3	50	0	0	53	26.0
	73	1,005.8	8	33	0	0	41	24.5
	74	1,378.8	23	38	0	0	61	22.6
	75	2,340.8	0	88	0	0	88	26.6
	77	2,524.0	25	36	36	0	97	26.0
VCU Total		10,165.2	67	298	36	0	401	25.3
236	10	2,060.0	125	3	0	0	128	16.2
	31	1,330.0	0	50	0	0	50	26.6
	32	1,088.0	68	0	0	0	68	16.0
	34	1,409.8	0	53	0	0	53	26.6
	44	1,704.0	30	46	0	0	76	22.4
VCU Total		7,611.8	223	152	0	0	375	22.4
237 ²	2	766.2	3	27	0	0	30	25.5
	26	2,012.6	30	43	12	0	85	23.7
	27	2,049.8	8	15	47	0	70	29.3
	29	1,166.0	23	30	0	0	53	22.0
	30	2,267.8	3	53	25	0	81	28.0
VCU Total		8,262.4	67	168	84	0	319	25.9
238	1	1,304.0	15	40	0	0	55	23.7
	3	467.2	13	0	8	0	21	22.2
	4	957.8	5	33	0	0	38	25.2
	5	986.0	45	10	0	0	55	17.9
	6	2,048.0	128	0	0	0	128	16.0
	7	874.0	38	10	0	0	48	18.2
	8	1,066.0	50	10	0	0	60	17.8
	9	208.0	13	0	0	0	13	16.0
	10	807.8	5	3	20	0	28	28.9
	11	1,348.0	28	18	13	0	59	22.8
	12	1,010.8	0	38	0	0	38	26.6
	13	798.0	0	30	0	0	30	26.6
	14	1,091.0	10	35	0	0	45	24.2
	15	1,697.8	18	53	0	0	71	23.9
	16	1,119.8	5	33	5	0	43	26.0
VCU Total		15,784.2	373	313	46	0	732	21.6

(Continued)

2 Alternatives

Table 2-7 (Continued)

Proposed Timber Harvest by VCU, Harvest Unit, and Volume Class for Alternative 7

VCU	Unit Number	Volume (MBF)	Volume Class (acres) ¹				Total Acres	Volume/Acre
			4	5	6	7		
239	6	336.0	21	0	0	0	21	16.0
	7	3,230.0	14	113	0	0	127	25.4
	17	3,005.8	0	113	0	0	113	26.6
	56	960.0	60	0	0	0	60	16.0
	59	1,808.8	0	68	0	0	68	26.6
	61	1,383.2	0	52	0	0	52	26.6
	62	1,791.0	3	57	7	0	67	26.7
VCU Total		12,514.8	98	403	7	0	508	24.6
242	94	2,024.0	60	40	0	0	100	20.2
	95	2,024.0	60	40	0	0	100	20.2
	96	1,995.0	0	75	0	0	75	26.6
	218	1,737.0	67	25	0	0	92	18.9
VCU Total		7,780.0	187	180	0	0	367	21.2
243	105	1,944.0	55	40	0	0	95	20.5
	111	2,931.8	12	103	0	0	115	25.5
	113	740.2	18	17	0	0	35	21.1
	115	1,565.2	28	42	0	0	70	22.4
	129	910.8	27	18	0	0	45	20.2
	130	1,120.0	70	0	0	0	70	16.0
VCU Total		9,212.0	210	220	0	0	430	21.4
244	122	2,501.0	15	85	0	0	100	25.0
	125	586.0	20	10	0	0	30	19.5
	126	772.0	15	20	0	0	35	22.1
	148	2,082.8	67	38	0	0	105	19.8
VCU Total		5,941.8	117	153	0	0	270	22.0
245	141	106.4	0	4	0	0	4	26.6
	142	266.0	0	10	0	0	10	26.6
	149	665.0	0	25	0	0	25	26.6
	150	345.8	0	13	0	0	13	26.6
	151	133.0	0	5	0	0	5	26.6
	152	532.0	0	20	0	0	20	26.6
VCU Total		2,048.2	0	77	0	0	77	26.6
Total for All VCUs		79,320.4	1,342	1,964	173	0	3,479	22.8

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

² These VCUs are being considered for Wilderness designation in H.R. 987.

*Draw Between
Upper Kadashan and
Upper Sitkoh Bay Drainages*

Comparison of the Alternatives

The comparison of alternatives draws together the conclusions from the materials presented throughout the document and provides the results of the analysis. It also presents the rationale leading to the identification of the preferred alternative. The following sections compare the environmental impacts of the alternatives on the basis of the Chapter 4 analysis. The discussion next focuses on the issues, presenting a perspective on their perceived importance; it also compares the alternatives on the basis of management opportunities where they may differ in some enhancement of present or future amenities, resource production capabilities, or usability of resources. The discussion continues by comparing the economic aspects of the alternatives including both their direct and indirect costs and benefits. The discussion ends by comparing effectiveness of the alternatives in meeting the management direction of the Tongass Land Management Plan and the contract requirements of the APC Long-Term Timber Sale Contract.

Impact Comparison

Table 2-8 provides a summary comparison of the impacts anticipated from each of the alternatives. This table summarizes more detailed information found in Chapter 4, Environmental Consequences. Figure 2-1 shows a comparison of road construction for all alternatives. The first part of Chapter 2 above presents a description of each alternative, while the analyses in Chapter 4 provide more detailed information on and the analysis of the impacts of the alternatives.



2 Alternatives

Table 2-8

Summary Comparison of Alternatives¹

	Alternative 1 No Action/Current Direction	Alternative 2	Alternative 3
Soils	No additional impacts.	No units or roads would be located on extreme hazard soils. This would greatly reduce the potential to adversely impact soil productivity, mass wasting, and soil loss.	Impacts would be the same for all action alternatives.
Vegetation	Tree species composition and density would not change. No planting or precommercial thinning would be needed.	Tree and understory species composition would be slightly altered on 2,472 acres. Pre-commercial thinning would be scheduled to accelerate both understory and conifer growth rates.	Tree and understory species composition would be slightly altered on 3,036 acres. Pre-commercial thinning would be scheduled to accelerate both understory and conifer growth rates.
Wildlife			
<i>Beach Fringe</i>	No additional impacts. To date, 1,055 acres, or 19 percent, has been impacted.	Beach fringe would not be further impacted.	
<i>Estuarine Fringe</i>	No additional impacts. To date, 413 acres, or 21 percent, has been impacted.	Estuarine fringe would not be further impacted	
<i>Eagle Sites</i>	No known eagle nest sites would be impacted.		
<i>Deer Winter Range</i>	Deer winter range would not be further impacted. To date, 3,930 acres, or 19 percent, has been impacted.		Approximately 155 acres or 1.0 percent of existing deer winter range (DWR) impacted. This is within TLMP Guidelines. Total impacted to date is 19 percent.
<i>Inland Wetlands</i>	No additional impacts. To date, 222 acres, or 20 percent, has been impacted.	Inland wetlands would not be further impacted.	
<i>Streamside/Riparian</i>	No additional impacts. To date, 1,799 acres, or 22 percent, has been impacted.	Streamside/Riparian habitat would not be further impacted.	Total of 317 acres or 4.0 percent of Streamside/Riparian acres. TLMP calls for 20 percent in LUD III or 10 percent in LUD IV to be retained. Impacts are within TLMP Guidelines.

(Table Continued)

Alternative 4	Alternative 5	Alternative 6	Alternative 7
Impacts would be the same for all action alternatives.			
Tree and understory species composition would be slightly altered on 3,008 acres. Pre-commercial thinning would be scheduled to accelerate both understory and conifer growth rates.	Tree and understory species composition would be slightly altered on 5,013 acres. Pre-commercial thinning would be scheduled to accelerate both understory and conifer growth rates.	Tree and understory species composition would be slightly altered on 3,383 acres. Pre-commercial thinning would be scheduled to accelerate both understory and conifer growth rates.	Tree and understory species composition would be slightly altered on 3,243 acres. Pre-commercial thinning would be scheduled to accelerate both understory and conifer growth rates.
Beach fringe would not be further impacted	Less than one percent (approximately five acres) of beach fringe would be further impacted.		Beach fringe would not be further impacted.
Estuarine fringe would not be further impacted.		Approximately 20 acres, or one percent, would be impacted.	Estuarine fringe would not be further impacted.
No known eagle nest sites would be impacted by any of the alternatives.			
Approximately 360 acres (2%) of existing DWR would be impacted. This is within TLMP Guidelines.	Greatest impact on DWR. Approximately 1,468 acres or 9 percent of existing DWR impacted. This is within TLMP Guidelines.	Approximately 559 acres (3%) of existing DWR would be impacted. This is within TLMP Guidelines.	Approximately 429 acres (2%) of existing DWR would be impacted. This is within TLMP Guidelines.
Inland wetlands would not be further impacted.			
Total of 135 acres or 2.0 percent of Streamside/Riparian acres. Impacts are within TLMP Guidelines.	Total of 135 acres or 2.0 percent of Streamside/Riparian acres. Impacts are within TLMP Guidelines.	Total of 135 acres or 2.0 percent of Streamside/Riparian acres. Impacts are within TLMP Guidelines.	Total of 55 acres (less than 1.0 percent) of Streamside/Riparian acres. Impacts are within TLMP Guidelines.

(Table Continued)

2 Alternatives

Table 2-8 (Continued)

Summary Comparison of Alternatives¹

	Alternative 1 No Action/Current Direction	Alternative 2	Alternative 3
Fish Habitat			
<i>Aquatic Habitat Management Units</i>	No additional impacts.	Three units with 100 foot buff- ers on Class I; one unit with a 50 foot buffer on Class II	Three units with 100 foot buff- ers on Class I; two units with 75 foot buffers on Class II; eight units with 100 foot buff- ers on Class II; two units with 50 foot buffers on Class II.
<i>Roads and Crossings</i>	No additional impacts.	About 0.4 miles of road re- quires AHMU protection meas- ures. Seven Class I stream crossings would require bene- fit/cost analysis.	About 1.6 miles of road re- quires AHMU protection meas- ures. Eleven Class I stream crossings would require bene- fit/cost analysis.
<i>Stream Flow</i>	No change.	Little potential for change instream flows.	
<i>Sediment</i>	No change.	Application of standards and guidelines is expected to minimize impacts to soils.	
Marine Environment			
		Low potential for impacting marine fisheries outside the sill. Little impact on salmon or herring or crab.	
Land Status			
	No change.	No change.	No change.
Recreation			
	Would maintain the existing recreational character.	Additional logging in VCU 236 and 239 would represent a 1,227 acre change in recrea- tion opportunities within the area from semi-primitive non- motorized to road modified or roaded natural.	AA6 would shift from semi- primitive nonmotorized to roaded natural or roaded modified in VCUs where har- vest activities are taking place.

(Table Continued)

Alternative 4	Alternative 5	Alternative 6	Alternative 7
All Class I. One unit with a 25 foot buffer; three units with 50 foot buffers; two units with 75 foot buffers; 9 units with 100 foot buffers.	Class I: one unit with a 25 foot buffer; three units with 75 foot buffers; four units with 50 foot buffers; three units with 100 foot buffers. Class II: one unit with a 75 foot buffer.	All Class I. One unit with a 50 foot buffer; one unit with a 75 foot buffer; ten units with 100 foot buffers.	All Class I. One unit with a 50 foot buffer; one unit with a 75 foot buffer; eight units with 100 foot buffers.
About 1.4 miles of road would require AHMU protection measures. Fifteen Class I stream crossings would require benefit/cost analysis.	About 0.8 miles of road would require AHMU protection measures. Fifteen Class I stream crossings would require benefit/cost analysis.	About 2.2 miles of road would require AHMU protection measures. Seventeen Class I stream crossings would require benefit/cost analysis.	About 1.6 miles of road would require AHMU protection measures. Thirteen Class I stream crossings would require benefit/cost analysis.
Little potential for change in stream flows.			
Application of standards and guidelines is expected to minimize impacts to soils.			
Low potential for impacting marine fisheries outside the sill. Little impact on salmon or herring or crab.			
No change.	No change.	No change.	No change.
Analysis area would shift from semi-primitive nonmotorized to roaded natural or roaded modified in VCU's where harvest activities are taking place.			

(Table Continued)

2 Alternatives

Table 2-8 (Continued)

Summary Comparison of Alternatives¹

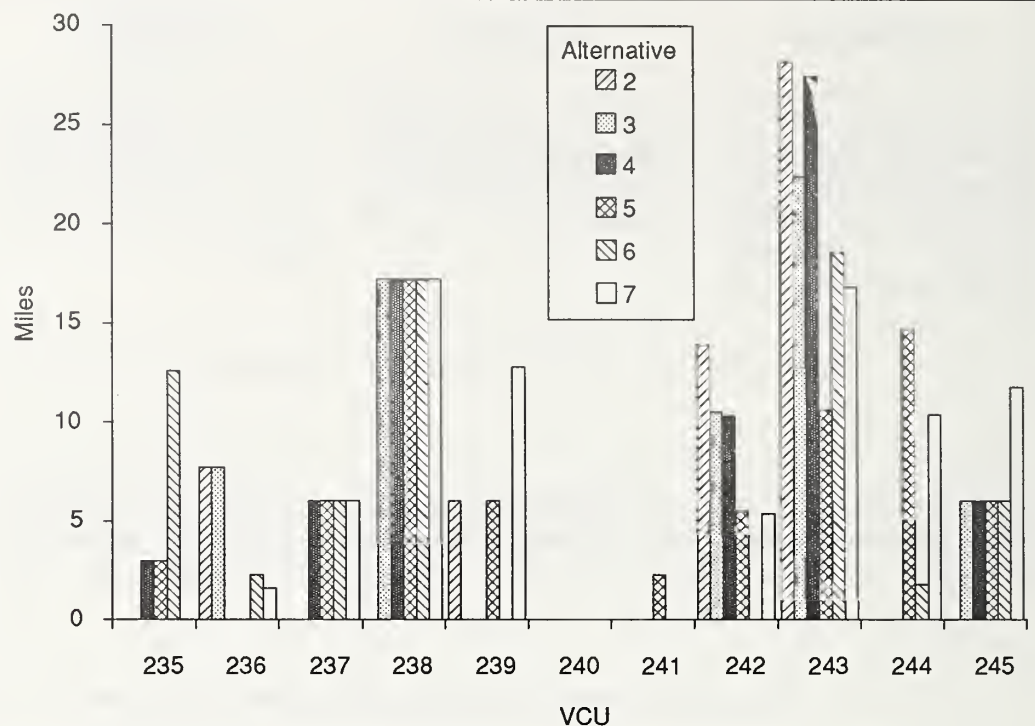
	Alternative 1 No Action/Current Direction	Alternative 2	Alternative 3
Visual	Visual character would not be affected.	Four VCUs would be entered and two meet assigned VQOs. VCUs 239 and 243 would not fully meet assigned VQOs.	Five VCUs would be entered and three meet assigned VQOs. Portions of VCUs 239 and 243 would not fully meet assigned VQOs.
Cultural Resources	No impact.	No impacts to known cultural resources.	
Socioeconomics	Impacts would include loss of 167 jobs and \$3.8 million in salaries for the timber industry.	Harvest volume would maintain 393 jobs and \$9.1 million in salaries.	Harvest volume would maintain 535 jobs and \$12.4 million in salaries.
Subsistence	Significant possibility of a significant restriction of subsistence use of wildlife.		
Timber/Firewood	Free use policies not affected.	Free use policies not affected.	
Reasonably Foreseeable, Long-Term, and Cumulative Effects	Minimal effects on all resources evaluated, except as described under subsistence.		

¹ A detailed comparison of impacts is found in Chapter 4.

Alternative 4	Alternative 5	Alternative 6	Alternative 7
Four VCUs would be entered and three meet assigned VQOs. This alternative causes least impact to visual character. Portions of VCU 243 would not fully meet assigned VQOs.	Nine VCUs would be entered and three meet assigned VQOs. Greatest impact to area's visual quality.	Four VCUs would be entered and two meet assigned VQOs. Portions of VCUs 235 and 243 would not fully meet assigned VQOs.	Nine VCUs would be entered and four meet assigned VQOs. VCUs 236, 237, 238, and 242 meet assigned VQOs.
No impacts to known cultural resources.			
Harvest volume would maintain 535 jobs and \$12.4 million in salaries.	Harvest volume would maintain 975 jobs and \$22.6 million in salaries.	Harvest volume would maintain 637 jobs and \$14.8 million in salaries.	Harvest volume would maintain 620 jobs and \$14.4 million in salaries.
Significant possibility of a significant restriction of subsistence use of wildlife.			
Free use policies not affected.			
Minimal effects from all alternatives on all resources evaluated, except as described under subsistence.			

Figure 2-1

Road Construction Required for Each Alternative in Each VCU¹



SOURCE: SEIS Planning Record.

¹ All currently authorized road construction is anticipated to be completed prior to the ROD, therefore no road construction is shown for Alternative 1.

Issue Comparison

Chapter 1 lists the issues that are the focus of the Phase I and Phase II SEISs, as well as management opportunities and concerns. The following paragraphs compare the alternatives in terms of these issues and the management opportunities and concerns.

Issue 1: Socioeconomic effects of timber harvesting and associated development

The baseline for comparing the alternatives is the No Action-Current Direction Alternative. The Forest Service predicts that all of the available volume in the nondeferred VCUs will be harvested by the end of the current 1989 operating season.

The No Further Harvest Alternative in Analysis Area 6 would have severe consequences to the ability of the Forest Service to meet its contractual obligations to the Alaska Pulp Corporation. Selection of the No Further Harvest Alternative in Analysis Area 6 would severely limit the choice of alternatives from the other areas that could be selected to meet the contract needs. The No Further Harvest Alternative could result in the Government breaching the terms of the Contract. Unilateral breach and possible termination of the long-term timber sale contracts would likely result in a large damage claim which the Congressional Research Service estimates might be as high as \$53.7 million for the APC Contract.

Alternatives 2 through 7 provide a range of timber volume, as described in this Chapter, that would provide sufficient volume to assist in maintaining the existing timber-related employment opportunities in the region. Alternative 5, which provides the most volume, would maintain approximately 1,022 direct and indirect jobs. Alternative 2 would maintain 450 direct and indirect jobs. Refer to the Economic Comparisons section for further discussion.

Main Street, Tenakee Springs, Alaska



Issue 2: Costs and benefits associated with implementing the alternatives.

The No Action - Current Direction Alternative is the baseline for comparing the impacts of this issue. The summary of cost/value analysis presented in the Economic Comparison section describes the dollar values maintained or forgone by each of the alternatives being evaluated. The No Further Harvest Alternative could also impact the cost of operation at the APC Pulp Mill. Arguably, a volume disruption of this type could cause the pulp mill to experience temporary shutdowns. The cost of a temporary shutdown is estimated by APC to be \$500,000, plus \$4,800 for every day of shutdown (Appendix A-4a, Draft SEIS). None of the alternatives would have any measurable direct effect on commercial fishing, recreation, tourism, or other sectors of the economy.

Issue 3: Effects of timber harvest and related activities on fisheries habitat.

The No Action-Current Direction Alternative provides the baseline for comparing the alternatives. The assumptions made for the socioeconomic issues also pertain to the comparison of proposed timber harvest alternative effects on fisheries.

The evaluation in Chapter 4 shows that the potential effects on the fisheries resources evaluated are minimal. Forest Service staff followed the 1986-90 FEIS standards and guidelines and the Alaska Region Aquatic Habitat Management Unit (AHMU) Guidelines (Forest Service 1986a) in developing the timber harvest alternatives to minimize the potential for impact on the valuable salmon and trout fisheries in Analysis Area 6. Adhering to the AHMU Guidelines during the formulation of alternatives minimized the total stream bank miles affected, the number of stream crossings, and the amount of potential road construction within designated AHMUs. Site-specific prescriptions have been developed and were selected according to each situation to minimize the potential for impact on the stream spawning and rearing habitat. The site-specific aquatic habitat management unit prescriptions are noted on the individual timber harvest unit cards in Appendix A-1.

2 Alternatives

Spawning Salmon



Issue 4: Effects of timber harvest and related activities on wildlife habitat.

The baseline for comparison of alternatives is the No Action-Current Direction Alternative. The assumptions made for the socioeconomic issues also pertain to the following discussion on comparison of proposed timber harvest alternative effects on wildlife. Two points in time were used to evaluate the extent of potential wildlife effects. A point prior to timber harvesting in the area was used when comparing the percent reduction of habitat capability. A point in time after scheduled timber harvest activities in this SEIS was used to determine total impacts to emphasis habitat.

The evaluation presented in detail in Chapter 4 and summarized here shows the potential effects on the wildlife resources evaluated to be minimal. Based on current habitat capability projections, Analysis Area 6 has the potential to support over 4,063 deer and over 448 pine martens.

The potential reduction of habitat capability by the proposed timber harvest alternatives ranges from 71 to 159 deer and 7 to 16 pine martens (Table 2-9). The potential percent reduction by alternative ranges from 1.0 to 3.4 percent for deer and 1.6 to 3.6 percent for the pine marten (Table 2-9).

Table 2-10 displays the acres of inventoried wildlife habitat that would be affected by the proposed timber harvest alternatives and it displays the percent of unaffected wildlife habitat. Although the acres affected vary from alternative to alternative, the amount of acres affected in respect to the total inventoried emphasis species habitat acres is small.

The Record of Decision for the 1986-90 Operating Period FEIS for the APC Long-Term Timber Sale prescribed approximately 88,500 acres to be managed in Old-Growth Habitat Condition for wildlife, of which 10,489 acres are in Analysis Area 6. The prescription was to remain in effect during the 1986-1990 Operating Period unless the stated management direction is modified after further NEPA analysis and public disclosure. The Supplement displays the effect on that designated Old-Growth Habitat of new alternatives being considered in this NEPA assessment. Table 2-11 displays the range of acres that would be affected and the percent of Old-Growth Habitat Condition remaining by proposed timber harvest alternative. Timber harvest effects shown for the emphasis species and emphasis habitats are indicative of the effects on other wildlife species and their habitats in Analysis Area 6.

Sitka Black-tailed Deer



Table 2-9

Projected Changes in Wildlife Habitat Capability Based on Models

	Alternative						
	1	2	3	4	5	6	7
Deer Habitat Capability							
Potential Reduction (individuals)	— ¹	46	84	71	159	95	82
Potential Reduction (percent)	— ¹	1.0	1.8	1.5	3.4	2.0	1.7
Brown Bear Habitat Capability							
Potential Reduction (individuals)	— ¹	2	10	14	22	35	14
Potential Reduction (percent)	— ¹	1.0	4.8	6.7	10.5	16.7	6.7
Pine Marten Habitat Capability							
Potential Reduction (individuals)	2.0	15	19	33	37	79	34
Potential Reduction (percent)	1.0	3.3	4.2	7.3	8.2	17.6	7.6

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, Theme Response 9, Data and Models Used.

¹ No additional change.

2 Alternatives

Table 2-10

Changes in Wildlife Habitat Due to Timber Harvest

	Alternative						
	1	2	3	4	5	6	7
Forested							
Proposed Harvest (acres)	276	2,472	3,036	3,008	5,013	3,383	3,243
Percent Remaining	87	86	85	85	84	85	85
Deer Winter Range							
Proposed Harvest (acres)	0	155	155	0	358	0	302
Percent Remaining	81	80	80	81	79	81	79
Inland Wetland							
Proposed Harvest (acres)	0	0	0	0	0	0	0
Percent Remaining	80	80	80	80	80	80	80
Beach Fringe							
Proposed Harvest (acres)	0	21	0	0	287	42	0
Percent Remaining	81	81	81	81	76	81	81
Estuarine Fringe							
Proposed Harvest (acres)	0	0	0	0	0	0	0
Percent Remaining	79	79	79	79	79	79	79
Streamside Riparian							
Proposed Harvest (acres)	0	0	317	375	461	375	0
Percent Remaining	78	78	74	73	73	73	78

SOURCE: 1986-90 FEIS (Forest Service 1986b) and SEIS Planning Record.

Issue 5: Distribution of harvest by volume class.

Table 2-12 summarizes the acres proposed for harvest by volume class. Figure 2-2 shows the cumulative percentage of acres in each volume class harvested or proposed for harvest under each alternative. Alternative 1 provides the baseline for comparing the action alternatives for this analysis area.

Issue 6: Log Transfer Facility (LTF) location and potential environmental effects.

All alternatives use the existing LTF at Corner Bay. Alternatives 2, 3, 5, and 7 propose the reactivation of the LTF at Sitkoh Bay, or False Island. Alternative 7 also proposes using the Todd LTF. Depending on whether the False Island LTF or the Sitkoh Bay LTF or both are used under these alternatives, the volume of timber moving through a specific LTF will vary. If only one LTF is used, the impacts will only be at the log transfer facility. Impacts at a log transfer facility will also be greater if it is the only one used than if the timber volume is split between the two facilities. No new LTF sites are proposed by any alternatives. All of these sites have current Corps of Engineers permits as well as ADNR tideland leases. The Corps of Engineers permit and the ADNR title and lease for the Sitkoh Bay LTF expires May 5, 1989, but renewals have been applied for that would extend the expiration to the end of the APC contract.

Table 2-11

Changes in Old-Growth Habitat Prescriptions Due to Timber Harvest¹

	Alternative						
	1	2	3	4	5	6	7
Old-Growth Conditions							
Proposed Harvest (acres)	0	317	188	0	990	179	304
Percent Remaining	100	97	98	100	90	98	97

SOURCE: 1986-90 FEIS (Forest Service 1986b).

¹ Term refers to old growth as described on page 4-13, 1986-90 FEIS.

Issue 7: Effects on resource values of high-interest areas.

High-interest areas were defined, based on the public response, in the 1986-90 FEIS (Forest Service 1986b, p. 1-20). In Analysis Area 6, Kadashan (VCU 235) was noted by ADF&G, SEACC, and other groups and individuals for its fisheries and wildlife values. While not specifically singled out in the 1986-90 FEIS as an area of high-interest, VCU 237, along with VCU 235, is being considered for Wilderness designation under H. R. 987.

Alternatives 1 through 3 would not harvest in VCUs 235 or 237. Alternatives 4 through 6 propose harvest of 10.7 MMBF and Alternative 7 proposes harvest of 8.3 MMBF in VCU 237. Alternative 4 proposes road construction in VCU 235, but no harvest. Alternatives 5 through 7 propose harvest of 26.7 MMBF, 19.7 MMBF, and 10.2 MMBF, respectively, in VCU 235. For more detailed discussion on the impacts to resources of concern in these areas see Chapter 4, Environmental Consequences.

Issue 8: Effects on visual, recreation, and wilderness resources.

Visual Resources: Alternative 1 would have the least effect on visual resources. The action alternatives would have the following effects:

Alternative 2 would enter 4 of the 11 VCUs in Analysis Area 6. Of those four, two VCUs (236 and 242) would fully meet the assigned VQOs. Portions of VCUs 239 and 243 would not fully meet the assigned VQOs.

Table 2-12

Acres Proposed for Harvest

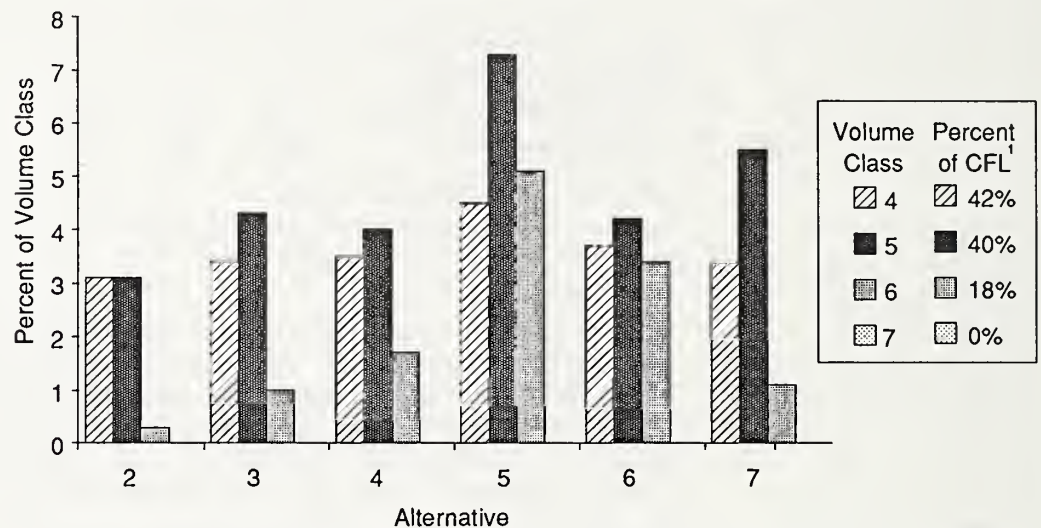
Volume Class ¹	Alternative						
	1	2	3	4	5	6	7
4	160	1,233	1,288	1,321	1,675	1,240	1,163
5	116	1,188	1,580	1,421	2,546	1,610	1,885
6	0	51	168	266	792	533	175
7	0	0	0	0	0	0	0
Total Acres	276	2,472	3,036	3,008	5,013	3,383	3,243

SOURCE: Multi-Entry Layout Process database, Chatham Area Supervisor's Office, Sitka, AK.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

Figure 2-2

Cumulative Percentage of Volume Classes, Including Proposed Harvest



SOURCE: SEIS Planning Record.

¹ Value includes Volume Classes 4 through 7 only.

The Sitkoh Bay LTF is located across Sitkoh Bay from the resort at the Chatham Cannery site. If this log transfer facility is chosen for use under this alternative, there would be an impact on the visual resources of VCU 243. These impacts would be less if the False Island LTF is also used and least if only the False Island LTF is used.

Alternative 3 proposes to enter five VCUs. Of those five, three VCUs (236, 238, and 242) would meet the assigned VQOs. Portions of VCUs 239 and 243 would not fully meet the assigned VQOs.

Alternative 4 would enter only 4 of the 11 VCUs in Analysis Area 6. Of those 4, 3 VCUs (237, 238, and 242) would fully meet assigned visual quality objectives. Portions of VCU 243 would not meet assigned VQOs.

Alternative 5 proposes to enter a total of nine VCUs. Three VCUs (237, 238, and 240) would meet the assigned visual quality objectives and six VCUs would have portions that would not fully meet the assigned VQOs. Compared to other alternatives, this alternative has the most VCUs that fail to fully meet the assigned VQOs.

The Sitkoh Bay LTF is located across Sitkoh Bay from the resort at the Chatham Cannery site. If this log transfer facility is chosen for use under this alternative, there would be an impact on the visual resources of VCU 243. These impacts would be less if the False Island LTF is also used and least if only the False Island LTF is used.

Alternative 6 would enter 4 of the 11 VCUs in Analysis Area 6. Of those four, two VCUs (237 and 238) would meet the assigned VQOs. Portions of VCUs 235 and 243 would not fully meet the assigned VQOs.

Alternative 7 proposes to enter a total of nine VCUs. Four VCUs (236, 237, 238, and 242) would meet the assigned visual quality objectives. Portions of the remaining five VCUs would not fully meet the assigned VQOs.

Recreation Resources: The No Action Alternative would result in the least impacts on recreation. Although changes in recreation opportunities would occur under all of the action alternatives, the scope of change is strongly related to the availability of access to Analysis Area 6. No increase in public transportation is likely. Therefore, recreational use is not expected to increase. These factors limit effects on recreation primarily to the few residents and to the limited number of users who access the area by boat.

Of the action alternatives, Alternative 2 would have the least impact on the Recreation Opportunity Spectrum (ROS). Under Alternative 2 the ROS designations would change on 1,227 acres in two VCUs. If the Sitkoh Bay LTF is activated under Alternative 2, there may also be effects on the steelhead fishery, which is a primary recreation resource in Analysis Area 6. These impacts would be less if the False Island LTF is also used and least if only the False Island LTF is used. Alternative 7 would have the greatest impacts, affecting the ROS designation on 8,183 acres over seven VCUs as well as the steelhead fishery in Sitkoh Bay.

Alternatives 3 and 4 would have similar levels of impact. The ROS designation would change on 4,078 acres over four VCUs under Alternative 3 and on 4,453 acres over three VCUs under Alternative 4. However, Alternative 3 also has the potential of impacting the Steelhead fishery in Sitkoh Bay if the Sitkoh Bay LTF were activated.

Similarly, Alternative 5 affects ROS designations on 6,260 acres over six VCUs and Alternative 6 changes the ROS designation on 6,360 acres over three VCUs. If the Sitkoh Bay LTF is activated under Alternative 5, there is the further potential of impacting the steelhead fishery.

More detailed information on visual, recreation, and wilderness resources can be found in Chapter 4, Environmental Consequences.

*Kook Lake, Popular
Recreation Site*



2 Alternatives

Issue 9: Effects of proposed activities on subsistence uses

Chapter 4 evaluates the potential of site-specific effects on subsistence use that could result from implementing any of the proposed timber harvest and associated road construction alternatives in Analysis Area 6. The Forest Service analysis indicates the implementation of Alternatives 1, 2, and 7 would have minor or no effects on the availability of subsistence resources. The analysis found the implementation of Alternatives 3, 4, 5, and 6 could potentially affect key subsistence wildlife species in a portion of Analysis Area 6. The principal subsistence use area that could be affected is Alaska Department of Fish and Game Minor Harvest Area 3527 (see Figure 3-2). The potential effect on key subsistence wildlife resources in Minor Harvest Area 3627 is enough to substantiate a finding that these alternatives may possibly restrict subsistence use in accordance with ANILCA Section 810.

The Forest Service held subsistence hearings in conformance with Section 810 of ANILCA following the release of the Draft SEIS. During the recent Tongass Resource Use Cooperative Survey, Tenakee Springs households expressed concerns about the potential effects on subsistence resources resulting from forestry management and fish and wildlife management

*Sockeye Salmon Fishing
in Basket Bay, an Important
Subsistence Fishery*



activities on National Forest lands. Angoon households interviewed were not as concerned about forestry management activities but were definitely concerned about the effects of hunting and fishing regulations. Sitka households were more concerned about the effects of hunting and fishing regulations than the effects forestry management activities would have on habitat. The hearings gave Angoon, Tenakee Springs, Sitka, and other subsistence communities further opportunity to provide additional information concerning potential subsistence use impacts associated with the proposed timber harvest alternatives in Analysis Area 6. The comments received during the hearings were considered during the preparation of the Final Environmental Impact Statement for the Supplement.

The ANILCA Section 810 Subsistence Evaluation in Chapter 4 projects Analysis Area 6 alternatives would result in an immediate or reasonably foreseeable significant possibility of a significant restriction of subsistence use of wildlife, but not for fish and shellfish, or other food resources. The evaluation further found that enough is known about foreseeable, programmatic Forest Service activities and foreseeable other potential activities to project that the cumulative effects may possibly restrict subsistence uses.

Management Concern 1 (from the 1986-90 FEIS): Use of nonstandard logging systems

All planned harvest in Analysis Area 6 uses only standard logging systems.

Management Concern 2 (from the 1986-90 FEIS): Development of area-wide transportation system.

Management Opportunity (from the 1986-90 FEIS): Interconnect existing road systems.

Management Opportunity: Reducing the administrative costs and risk to employees through increasing road access to work areas and by reducing the use of aircraft, specifically helicopters.

These three concerns/opportunities are closely related. From a management perspective, increasing access to more areas disperses the impacts of timber harvesting. Reducing the use of aircraft would decrease the risk of loss of life for Forest Service and APC employees as well as reducing administrative costs. Because no state public transportation system connects with the Forest road system in Analysis Area 6, no additional public transportation network benefits would accrue.

Management Concern (current management concern): The scope of activities proposed by the Supplemental EIS is constrained by a narrow time frame between the approval of the Record of Decision for this supplement and the end of the Operating Period.

The planning constraints are primarily the logistical problems of providing the balance of 1986-90 contractual volume while maximizing the potential for APC to log this volume during the balance of the Plan period. Volume not harvested by the end of the 1986-90 Operating Period will be available for transition into the 1991-95 Operating Period. Large amounts of road or other construction activities that need to be completed prior to making harvest units available reduce the potential of an alternative to respond to this concern.

Management Opportunity (from the 1986-90 FEIS): Increase harvest unit size to optimum, consistent with Regional Guide Policy and protection of other resource values.

In Analysis Area 6, 20 harvest units exceed 100 acres under all alternatives. The specific reasons for these large units are found on the individual unit cards in Appendix A-1. Units may exceed 100 acres in size due to transportation and harvest system requirements and a concern for blowdown hazards. The average harvest unit size differs very little between the alternatives. They range from 32 acres for Alternatives 4 and 6 to 77 acres for Alternative 2. In designing the action alternatives, the Chatham area interdisciplinary team planned unit sizes to protect the most resources possible, thus accomplishing this management opportunity.

2 Alternatives

*Second Growth Near
False Island*



Management Opportunity (from the 1986-90 FEIS): Maintenance of local economics. Please refer to the discussion of the socioeconomic issue above.

Management Opportunity (from the 1986-90 FEIS): Increase the productivity of the timber resource.

The depressed markets for lumber and pulp timber products of the early 1980s have been steadily rebounding. The opportunity now exists to increase the production of timber products to the levels anticipated by the TLMP schedule and as projected under the terms of ANILCA. The action alternatives would place varying proportions of the operable timber lands under intensive management, increasing the productivity of the timber resource. The No Action Alternative, however, would not provide this management opportunity.

Management Opportunity (from the 1986-90 FEIS): Maintain important fish and wildlife habitat.

Please refer to the discussion of the fisheries habitat and wildlife habitat issues above.

Management Opportunity (from the 1986-90 FEIS): Defer timber harvest and related activities in certain areas during the 1986-90 Operating Period.

Please refer to the discussion of the high-interest areas above.

Management Opportunity (from the 1986-90 FEIS): Make timber available to meet the Contract obligation.

Please refer to the discussion on the effectiveness of the alternatives.

Management Concern (current management concern): If the U.S. Senate passes Senate Bill 346, Wilderness designation for VCUs 235 and 237 would reduce the timber volume previously planned for harvest in this VCU. In order for the Forest Service to meet its contractual obligations, other VCUs within the Long-Term Sale Contract area would have to be entered to provide the required timber volume.

The new Congress is in the process of considering legislation known as the "Tongass Timber Reform Act." This act passed the House of Representatives on July 31, 1989, as H.R. 987. The companion bill, S.B. 346, has not yet been considered by the Senate. Decisions affecting VCUs 235 and 237 that are outside the scope of this SEIS will probably be made by one of several processes, including legislation, revision of the TLMP, analysis area planning, and/or EISs prepared for future operations. Alternatives 5, 6, and 7 propose harvest in both VCU 235 and 237. Alternative 4 proposes harvest in VCU 237 and road construction in VCU 235.

Economic Comparison of Alternatives

Economic consequences of the alternatives would differ. All alternatives except the No Action Alternative, would contribute volume toward the 4.5 billion board foot Tongass National Forest harvest level. The number of jobs and economic activity generated varies by the harvest level.

Estimates of the number of jobs to be maintained varies from 7 to 11 jobs per million board feet. For the purposes of this analysis 8.5 jobs/MMBF with an average value of \$23,200 is used (Forest Service 1986b). Based on this figure the economic contribution toward maintenance of jobs is displayed in Table 2-13. None of the alternatives are expected to affect employment in the commercial fishing, recreation/tourism, or related sectors of the economy.

The comparison of alternatives used the Region 10 Timber Appraisal Handbook (Forest Service 1986a) with Base Year 1986 costs adjusted to the quarter ending in June 1988. Appraisal logging costs, transportation costs, and manufacturing costs were developed for the action alternatives and are displayed below (Table 2-14). Also developed through the appraisal process are estimates of timber selling values and margin of profitability for the logger of average efficiency (Table 2-15).

APC Pulp Plant in Sitka, Alaska



Table 2-13

Economic Contribution of Alternatives

	Alternative						
	1	2	3	4	5	6	7
Volume of Harvest (MMBF)	5.6	53	68.1	67.6	120.2	80.4	79.3
Jobs Maintained	50	450	579	574	1,022	684	676
Value from Wages (Million\$)	1.2	10.5	13.5	13.4	23.8	15.9	15.7

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).

Table 2-14

Costs to an Operator of Average Efficiency (Million\$)

	Alternative					
	2	3	4	5	6	7
Logging Costs	5.0	9.1	8.9	15.7	10.5	10.9
Transportation Costs	4.6	7.6	9.2	12.1	11.2	10.0
Manufacturing costs	15.2	19.6	19.4	34.6	23.1	23.1
Total	27.3	36.3	37.6	62.4	44.8	44.0

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).

Table 2-15

Values to an Operator of Average Efficiency (Million\$)

	Alternative					
	2	3	4	5	6	7
Timber Selling Values	25.6	32.9	32.6	59.9	39.6	39.2
Margin of Profit	3.3	4.3	4.3	7.8	5.2	5.1
Total	29.0	37.2	36.8	67.7	44.8	44.3

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).

Effectiveness Comparison

A brief analysis of alternatives based on their effectiveness in meeting nonresource oriented management objectives discussed earlier in this chapter revolved around discussion of the following three considerations:

- how well each alternative meets the intent of the implementing Tongass Land Management Plan guideline for a LUD III or LUD IV area,
- how well the alternative meets the range of volume in Phase I SEIS to meet Alaska Pulp Corporation contractual obligations,
- how likely the alternative is to be implementable in terms of public controversy.

Public controversy in Southeast Alaska and in Analysis Area 6, in particular, will center around road construction and timber harvest in Kadashan, VCU 235. Also of concern will be harvest and road building in Trap Bay, VCU 237 and a second entry in Sitkoh Bay, VCUs 240 through 245, with resulting possible reuse of Sitkoh Bay LTF and False Island logging camp.

Concern is very likely to be polar in nature. Public representatives of pro-development concerns and those interested in maintaining the current economic situation will be very concerned with the loss of area and volume in this analysis area. This could cause the Forest Service to attempt to provide sufficient volume in other parts of the APC Contract area, which may not be possible within the SEIS time frame.

The public represented by the environmental community would look favorably on any alternative that would include the following elements; 1) no harvest in the Kadashan drainage and no connection of the Corner Bay and False Island road systems, 2) no plan for operations in Trap Bay, and 3) no second reuse in the Sitkoh Bay LTF.

Alternative 1 - No Action - Current Direction

This alternative would continue activities agreed to in the *Tenakee Springs v. Courtright* settlement agreement. No additional harvest would be authorized until a subsequent EIS could be completed. This alternative would not facilitate development of additional transportation system into new areas and is considered lowest in its effectiveness for implementing guidelines for LUD III and LUD IV areas and lowest in effectiveness for providing contract volume to APC.

Alternative 2

Alternative 2 proposes harvest in previously entered VCUs 236, 239, 242, and 243. This alternative would harvest from the existing road system and also proposes construction of 27 miles of new road. The Corner Bay LTF would be used and the Sitkoh Bay or the False Island LTF and False Island Camp would be reconstructed. This alternative would not meet the minimum volume level as projected in the Phase 1 SEIS. This would require the Forest Service to make up the additional volume in another analysis area, and could result in possible breach of the contract if the volume could not be made up. VCUs 237 and 238 would not be entered in this alternative, which means that the risk of losing volume due to possible deferral of these VCUs is low, and the Chatham Area would lose its investment for 1981-86 FEIS roads and units already laid out and designed. The economic benefits are relatively low and the volume harvested per mile of road is low. This alternative is considered moderate in effectiveness to implement TLMP guidelines for LUD III and LUD IV VCUs.

Alternative 3

This alternative proposes harvest in VCUs 236, 238, 239, 242, and 243. This alternative would meet the minimum level of harvest as projected for Analysis Area 6 in the Phase I Draft SEIS by providing 68 MMBF. Thirty-one miles of road would be built for this alternative for a volume to miles of road ratio of 2.0. This alternative would not harvest volume in VCU 237 as proposed in 1981-86 and 1986-90. Therefore, the Forest Service would forego its investment in road and unit layout work already finished in that VCU, but it would maintain the investment in VCU 238. Current employment levels would be maintained by this alternative for the logging contractor and the mills in Sitka and Wrangell.

This alternative is considered moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs and low to moderate in effectiveness to implement TLMP guidelines for LUD III VCUs.

Alternative 4

This alternative proposes harvest in VCUs 237, 238, 242, 243, and 244. It would maintain the Forest Service's investment in VCUs 237 and 238 for units and roads previously laid out for the 1981-86 operating period. This alternative meets the minimum harvest level projected in the Phase I Draft SEIS. The harvest of 67.5 MMBF would maintain employment levels for the contract logger and for the mills in Sitka and Wrangell. Thirty-seven miles of road would be constructed under this alternative for an average of 2.0 MMBF/mile.

2 Alternatives



Eagle Nest

This alternative is considered moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs and low to moderate in effectiveness to implement TLMP guidelines for LUD III VCUs.

Alternative 5

This alternative proposes harvest in VCUs 235 and 237 through 244. It would maintain the Forest Service's investment in VCUs 237 and 238 for units and roads previously laid out for the 1981-86 operating period. This alternative exceeds the maximum harvest level projected in the Phase I Draft SEIS. The harvest of 120 MMBF would increase employment levels and would maintain employment levels for the two mills in Sitka and Wrangell and would allow the Forest Service more latitude in the selection of harvest units in the other Analysis Areas. Thirty-seven miles of road would be constructed by this alternative for an average of 2.9 MMBF/mile. This alternative has the best economic return of all alternatives in this Analysis Area, and harvests the largest percentage of high volume stands.

This alternative is considered high in effectiveness to implement TLMP guidelines for LUD IV VCUs and moderate to high in effectiveness to implement TLMP guidelines for LUD III VCUs.

Alternative 6

This alternative proposes harvest in VCUs 235, 237, 238, and 243. It would maintain the Forest Service's investment in VCUs 237 and 238 for units and roads previously laid out for the 1981-86 operating period. This alternative exceeds the maximum harvest level projected in the Phase I Draft SEIS. The harvest of 80 MMBF would maintain employment levels for the contract logger and for the mills in Sitka and Wrangell. The Kadashan Road would be connected by this alternative, and neither the Sitkoh Bay LTF or False Island LTF would be reconstructed. Forty-four miles of road would be constructed for an average of 1.7 MMBF/mile.

This alternative is considered high in effectiveness to implement TLMP guidelines for LUD IV VCUs and moderate to high in effectiveness to implement TLMP guidelines for LUD III VCUs.

Alternative 7

This alternative proposes harvest in VCUs 235 through 239 and 242 through 245. It would partially maintain the Forest Service's cost for units and roads laid out for 1981-86, however, some of the units have been redesigned and others have been dropped. Harvest would also occur in Kadashan, but the road connection would not be built. The Todd and Sitkoh Bay LTFs would be rebuilt and the Todd blowdown units would be harvested. This alternative would harvest slightly in excess of the maximum volume outlined in the Phase I Draft SEIS. It would maintain current levels of employment for the contract logger and for the mills in Sitka and Wrangell.

This alternative has moderate to high potential for public controversy associated with it, primarily due to harvest in Kadashan.

This alternative is considered moderate in effectiveness to implement TLMP guidelines for LUD IV VCUs and low to moderate in effectiveness to implement TLMP guidelines for LUD III VCUs.

Chapter 3

Affected Environment



Chapter 3

Affected Environment

This chapter provides information about the existing environment of Analysis Area 6 that may be affected by implementing any of the alternatives as described in Chapter 2. It includes discussions of soils, vegetation, access, logging facilities, timber volume, wildlife, fisheries, watersheds, marine environment, land status, recreation, visual characteristics, cultural resources, socioeconomic, and subsistence. The information presented here augments and summarizes sections addressing the affected environment of the 1981-86 and 1986-90 FEISs and the Phase I Draft SEIS. The area designated as Analysis Area 6, located on the southeastern part of Chichagof Island, includes approximately 170,607 acres and is comprised of two management areas and 11 VCUs (see map insert, back cover) as follows:

- Kadashan Management Area C36: VCU 235 (LUD III)
- Corner Bay Management Area C37: VCUs 236, 237, 238, 240, 241, 242, 243, 244, and 245 (LUD IV) and VCU 239 (LUD III).

*Timber Harvest Units in the
Kook Creek Drainage*



Soils

Glacial history in Southeast Alaska has played an important part in the placement and character of soil parent material in many places. The development of soils is influenced by high levels of rainfall, cool summer temperatures, a short growing season, and moderately low soil temperatures. Under such conditions, organic matter decomposes slowly and tends to accumulate in areas where it is being produced or deposited. Because of the high rainfall, the available nutrients can be leached rapidly, and exposed mineral soils are subject to erosion. In general, the characteristics of the parent material, the topography, vegetation, and the soil development factors all influence the features of soils that affect and are affected by timber harvest activities.

In general, shallow soils with good drainage develop on steeper slopes due to rapid loss of material by erosion and efficient rainwater runoff. Deep, well drained soils commonly occur below shallow soils on gentler slopes where transported soil materials have collected. Poorly drained soils are associated with low relief and impermeable subsurface layers. In locations with poor drainage, deep organic soils (muskegs) tend to form. This situation occurs where the soil material fails to provide sufficient internal drainage or where topography prevents external drainage. These areas are generally not well suited for road construction since the soil materials tend to be wet and have associated low bearing strengths. Drainage improves with increased slope gradient; however, as slopes become oversteepened, soil depths become much shallower. In riparian areas, soil zones tend to contain sand and gravel as a result of flood deposition.

Soil productivity and nutrient status can be influenced in a number of ways. Removing the canopy of mature and overmature forest allows increased solar radiation to penetrate and warm the soil. This process leads to a temporary rise in available soil nutrients, particularly nitrogen. The result is a proliferation of rapidly growing forbs, shrubs, and tree seedlings. Consequently, the total annual biomass production may be greater than it was in the slow growing forest. Thus, total soil productivity increases, at least temporarily, after logging. The duration of the increase is not known. However, many soils hold a high percentage of their stored plant nutrients in the duff (organic humus) layer on or within a few inches of the surface. Removing the duff layer can reduce the supply of available plant nutrients and soil productivity. Without the trees to recycle nutrients, some are lost through leaching; but because of the large accumulations of surface organic matter and the rapid regrowth of vegetation, such losses are negligible.

The potential for sediment production (sedimentation of streams) is based upon soil properties that are important when a site is disturbed by natural or management-induced means. These soil properties include erodability, mass wasting (landslide) hazard, quantity of soil material available as sediment, amount of unvegetated or bare soil, and the effects of climate (e.g., intensity and frequency of rainfall).

Most undisturbed soils in Analysis Area 6 are resistant to surface erosion. Relatively thick layers of surface organic matter and surface mats of vegetation act as protective covers that minimize surface erosion. However, natural sources of surface erosion and mass wasting do exist, and include streambanks, snowslide or avalanche slopes, and V-notches.

Landslide hazard classes are used to group soil/landtype units that have similar properties regarding the stability of natural slopes. Four hazard classes (extreme, high, moderate, and low) rank soil/landtype units according to their relative potential for mass wasting. The Forest Service now avoids scheduling timber harvest or road building on the extreme-hazard soil/landtype units that are least stable and have the greatest probability of slope failure.

These include shallow, fine textured soils on slopes of 75 percent or greater, as well as some soils with restricted drainage on slopes in excess of 65 percent. Nearly all naturally occurring

landslides are found on extreme-hazard soil/landtype units. These areas often have visible indications of instability or past failures, such as slide scarps, tension cracks, or jack-strawed trees.

Soil mass movement is the dominant process of natural erosion in Southeast Alaska. The Forest Service has inventoried over 3,800 natural, large scale landslides that have occurred in the Tongass National Forest within the past 150 years (Forest Service 1977). Many landslides occur during, or immediately after, periods of heavy rainfall when soils are saturated. Particularly hazardous areas are steep slopes characterized by compacted glacial till or bedrock sloping parallel to the surface. When subjected to heavy rainfall, these areas have a high likelihood of mass movement, especially if disturbed by blasting during periods of soil saturation, side casting of excavated material, or logging practices that cause substantial surface disturbance.

Recent research on landslides in Southeast Alaska (Swanston 1989) has concluded that most landslides occur in unique topographical situations (slopes in excess of 75 percent hillslope depression). Although over 90 percent of all landslides in the past 20 years were not related to logging or roads, logging and roads do increase the potential for landslides in a given site. Naturally occurring slides tend to be larger and travel further than logging related slides. Only three percent of all slides reach anadromous fish streams.

Vegetation, tree roots in particular, seems to have a stabilizing effect on slopes. Tree roots tend to decrease significantly in strength five to seven years after the tree is cut. This decrease in soil holding capability results in a high likelihood of soil movement on steep slopes following clearcutting. Further, the displaced roots of uprooted trees can disturb the soil mantle whenever windthrow occurs. Under natural conditions, windthrow is an important triggering device of debris avalanches and flows in Southeast Alaska. The degree of predictability is complicated by an interaction of factors such as soil depth, texture, and coarse fragment content.

The following soils-related information for Analysis Area 6 is presented by VCU.

VCU 235: VCU 235 is comprised of 33,642 total acres. It borders on Tenakee Inlet and is dissected by Tonalite Creek and the Kadashan River, which discharge into Kadashan Bay, and by Hook Creek, which is a tributary of the Kadashan River. The area is characterized by frequently dissected mountainslopes of undifferentiated geology surrounding the major drainages. Extreme mass movement hazards are present on the very steep mountain slopes east of the Kadashan River, both north and south of Hook Creek, and at the headwaters of Tonalite Creek. Many of these slopes are influenced by avalanches and mass wasting and support a coniferous forest/alder shrubland complex.

Less hazardous soils occur on broken mountainslope and hillslope topography. These areas have slope gradients that are less than 75 percent and a lesser degree of slope dissection than extreme massmovement hazards. Soils on the footslopes adjacent to the major drainages have slope gradients that are typically less than 35 percent. These areas support a moderately to highly productive coniferous overstory interspersed with smaller areas of climax spruce forest located on deep, well drained alluvial soils.

An important estuarine zone is located at Kadashan Bay. It consists of sparsely vegetated mudflats, sedge marshland, and mixed forb grassland. A well defined riparian zone is located along the Kadashan and Tonalite stream systems. Wetland soils compose a significant portion of the VCU.

About 200 acres of timber harvest and road construction have taken place in this VCU. Of the total, 35 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 236: This VCU is comprised of 11,029 total acres. It is bounded on the north by Tenakee Inlet and is dissected by Corner Creek, which flows to Corner Bay. An extensive riparian zone consisting of deep, well drained alluvial soils is located along Corner Creek. These areas support climax spruce forest and spruce forest/alder shrubland complexes. Significant areas are subject to seasonal flooding. Wetland soils, which comprise nearly a third of the VCU, are common on the gently sloping lowlands within the unit. They range from deep organic peats to moderately deep mineral soils over compacted till.

Soils with an extreme mass movement hazard are primarily located east of Corner Creek on very steep mountainslopes influenced by snow avalanches and mass wasting and on mountainslope ravines. They support a coniferous forest/alder shrubland complex and are generally buffered from any riparian zones. Less hazardous soils occupy most of the rest of the VCU. Slope gradients are generally less than 75 percent and frequently less than 55 percent.

About 1,450 acres of timber harvest and road construction have taken place in this VCU. Of the total, 52 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 237: This VCU consists of a total of 6,646 acres. It borders on Tenakee Inlet and encompasses the Trap Bay area. One major stream system (Alaska Department of Fish and Game Anadromous Stream, Catalog #112-41-10100) is located within this unit. An estuarine zone consisting of sparsely vegetated mudflats is located at the mouth of the stream. This stream system has a significant riparian zone consisting of floodplains, footslopes, and alluvial fans that supports a climax spruce overstory. Poorly drained mineral soils and muskegs on gently sloping and flat lowlands are adjacent to the riparian zone in some locations. Wetland soils are found primarily along the stream system near Trap Bay.

In the southeast portion of the watershed, extreme mass movement hazard areas are immediately adjacent to a riparian zone and are associated with mountainslopes influenced by snow avalanches and mass wasting, and slopes dominated by cliffs and rock outcrops. Over steepened alpine mountainslopes and rugged alpine topography dominate the extreme southern part of the VCU.

The southern part of the unit below the alpine areas contains calcareous bedrock. This area of broken mountain and hillslopes supports marginally to highly productive coniferous forest depending on localized drainage. The slopes in this area are gentler than 55 percent. No previous timber harvest and road construction have taken place in this VCU.

VCU 238: VCU 238 consists of a total of 9,946 acres, is bordered by Chatham Strait on the east and is dissected by three major stream systems (Alaska Department of Fish and Game Anadromous Streams, Catalog Numbers 112-41-10360, 112-12-2004, and 112-12-10340). Extensive areas having an extreme mass movement hazard are located adjacent to a riparian zone along the southern stream system. The extreme hazard soils are on very steep mountainslopes influenced by snow avalanches and mass wasting, which support a coniferous forest/alder shrubland complex. The riparian zone along this southern stream system supports a climax spruce forest on deep alluvial soils. Much of the riparian zone is subject to seasonal flooding.

Extreme soil hazards are also present adjacent to the upper reaches of the middle stream system. The soils and vegetation, also adjacent to a riparian zone, are similar to those along the southern stream system.

Extreme hazard soils are not associated with the northern stream system. The stream crosses frequently dissected footslopes that support a moderately to highly productive coniferous-forest interspersed with muskegs containing deep organic soils in areas of very poor drainage. A glacial-marine terrace supporting marginally productive coniferous forest is located along the shoreline above beach and dune deposits. Sparsely vegetated mudflats and mixed forb

grasslands are present on an estuary at the mouth of the southernmost stream system. Rugged and rounded alpine topography is located in the western part of the VCU. No previous timber harvest and road construction have taken place in this VCU.

VCU 239: VCU 239 consists of 17,387 total acres. It borders on Chatham Strait and is dissected by Kook Creek that in turn is divided into two main sections. One extends from the headwaters to Kook Lake and the other extends from Kook Lake to Basket Bay. A major riparian zone is located along the northern and western sides of Kook Lake and south along a tributary of Kook Creek to the southern boundary of the VCU. This zone is on a large floodplain and adjacent lowlands. The alluvial soils are well drained and support a climax spruce forest. Another large riparian zone is located in the western part of the VCU and contains similar soil and vegetation.

Areas of extreme mass movement hazard are scattered along the southern boundary of the watershed on mountainslopes influenced by snow avalanches and mass wasting. The overstory consists of generally marginally productive coniferous forest interspersed with alder shrub lands.

The section of Kook Creek between Kook Lake and Basket Bay is not associated with any extensive riparian zones or areas of extreme mass movement hazard. The soils along the stream are mostly deep, poorly drained, and support a moderately productive coniferous forest. The adjacent rolling hillcountry and broken hillslopes have slope gradients generally less than 55 percent. The soils are mostly well drained and range from shallow to deep over calcareous bedrock. The overstory is highly productive coniferous forest.

A small sparsely vegetated mudflat is located at Basket Bay and another at the northern end of the VCU. Areas of alpine meadow are present in the southern part of the watershed.

About 1,230 acres of timber harvest and road construction have taken place in this VCU. Of the total, 64 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 240: VCU 240, consisting of 9,549 acres, borders on Chatham Strait and is dissected by Basket Creek and its tributaries. Basket Creek flows into Basket Lake prior to emptying into Little Basket Bay. Much of the southern portion of the VCU consists of oversteepened mountainslopes and rugged alpine topography. Areas of extreme mass movement hazard are located below these areas on steep mountainslopes influenced snow avalanches and mass wasting. Most of these soils support alder shrublands mixed with coniferous forest. Some hazardous soils are located adjacent to riparian zones along the southern portion of the watershed. A floodplain containing a spruce forest/alder shrubland complex is located along Basket Creek west of Basket Lake.

Shallow, poorly-drained wetland soils over compact till interspersed with deep organic soils are common on the gently sloping lowlands and footslopes. Generally deeper, better drained soils occur on broken mountain and hillslopes, and on infrequently dissected mountainslopes, which are common to the rest of the VCU. Most of these areas support a marginally to moderately productive coniferous forest. No previous timber harvest and road construction have taken place in this VCU.

VCU 241: VCU 241, consisting of 7,635 acres, borders on Chatham Strait and is dissected by a north and a south stream system (Alaska Department of Fish and Game Anadromous Stream, Catalog Numbers 112-12-10160 and 112-12-10080). Small riparian zones are located along each of the stream systems. Areas of extreme mass movement hazard are scattered throughout the watershed and are associated with steep mountainslopes influenced by snow avalanches and mass wasting. One area of extreme mass movement hazard is located adjacent to a riparian zone along the northern stream system and around the northern side of a lake. Rugged alpine topography and oversteepened alpine mountainslopes are located along the southwestern boundary of the VCU, and rounded alpine summits are present along the nor-

them boundary. A large area of deep, well drained soil over calcareous bedrock parallels the shoreline. This area supports a highly productive hemlock overstory on slope gradients gentler than 75 percent.

The remainder of the VCU is comprised primarily of forested mountainslopes and forested broken mountain and hillslopes with gradients less than 75 percent. The soils are moderately-well to well drained and range from shallow to deep over undifferentiated bedrock. Forest productivity in these areas is moderate to high.

About 720 acres of timber harvest and road construction have taken place in this VCU. Of the total, 40 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 242: VCU 242 consists of 11,334 total acres. It is composed of one major stream system (Alaska Department of Fish and Game Anadromous Stream, Catalog Number 112-12-10050), which can be divided into three main areas. One area extends from the mouth of the stream on Chatham Strait approximately to the middle of the VCU where the stream branches into two separate forks. These forks extend to the headwaters in a nearly parallel northwest trending direction.

The portion of the watershed from mid VCU to Chatham Strait consists of gently sloping lowlands and broken mountainslopes that do not exhibit extreme mass movement characteristics. Calcareous metasedimentary bedrock underlies the soil in the southeastern portion of the area. The lower reaches of the VCU consist of a mixture of well drained soils supporting a highly productive coniferous forest and poorly and very poorly-drained, marginally productive coniferous forest. A narrow riparian zone is present along the lower part of the stream system. This area undergoes seasonal flooding and supports a climax spruce forest. A sparsely vegetated mudflat is located at the mouth of the stream.

The two watersheds above the point where the main stream branches are similar. Each has an extensive riparian zone consisting of deep alluvial soils that support a climax spruce forest in the downstream portion of the watershed. Further upstream the alluvial soils are not as well developed and support a spruce forest/alder shrubland complex. Each of these riparian zones are adjacent to very steep mountainslopes influenced by snow avalanches and mass wasting. These areas exhibit an extreme mass movement hazard and support either alder shrublands or a coniferous forest/alder shrublands complex. The remainder of these areas consists of a mixture of forested soils that range from shallow to deep and from poorly to well drained. Productivity ranges from moderate to high although some very poorly drained nonforested or marginally forested mineral soils and nonforested muskegs are present near the headwaters of the streams. Small areas of oversteepened alpine mountainslopes and rounded alpine summits are located along the VCU boundary.

About 1,210 acres of timber harvest and road construction have taken place in this VCU. Of the total, 293 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 243: VCU 243, consisting of 27,710 acres, encompasses the Sitkoh and Florence Bay areas. This VCU contains one major stream system with multiple forks (Alaska Department of Fish and Game Anadromous Stream, Catalog Number 113-59-110070). The main stream flows into Sitkoh Bay through an extensive estuarine zone consisting of sparsely vegetated mudflats, sedge marshland, and mixed forb grassland.

This VCU has an extensive riparian zone and relatively few areas of extreme mass movement hazard. The unstable areas that are present within this VCU are scattered throughout the area. The riparian zones are comprised primarily of floodplains and frequently dissected footslopes or alluvial fans that support a climax spruce forest.

Oversteepened alpine mountainslopes and rounded alpine summits occur around the boundary of the watershed. The majority of areas exhibiting an extreme mass movement hazard, and especially in the area southwest of Sitkoh Bay, consist of very steep mountainslopes influenced by snow avalanches and mass wasting. Very steep mountainslope ravines are also common in the unit. The unstable areas support a coniferous forest/alder shrubland complex.

Low elevation areas north of Sitkoh and Florence Bays support a highly productive coniferous forest complex on steep, well drained, shallow to deep soils. The area south of Sitkoh Bay also supports a highly productive coniferous forest, however, the broken mountain and hill-slopes are not as steep. Soils are poor to well drained in character.

The rest of the forested soils in the VCU occur on a mixture of broken mountainslopes, gently sloping lowlands, and frequently dissected mountain and footslopes. Slope gradients are mostly gentle to moderate (less than 75 percent). The soils overlie compacted till, tend to be poorly drained, and are interspersed with muskegs. Productivity on the forested areas is generally low to moderate, although it is typically better on the steeper, well-drained slopes.

About 2,940 acres of timber harvest and road construction have taken place in this VCU. Of the total, 195 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 244: VCU 244 is comprised of 11,895 acres and surrounds the Sitkoh Lake area. It includes Sitkoh Creek, which flows from the lake to Sitkoh Bay, and several small streams that flow into Sitkoh Lake.

Three riparian zones are located around Sitkoh Lake. They consist primarily of alluvial fans that support a climax spruce forest.

Areas of extreme mass movement hazard are concentrated predominately in the northwestern part of the watershed. They consist of mountainslopes influenced by snow avalanches and mass wasting, and mountainslope ravines. These areas support a coniferous forest/alder shrubland complex and surround rounded alpine summits and oversteepened alpine mountainslopes.

Organic soils, which support a coniferous forest/muskeg complex, are present on the gently sloping lowlands common in the eastern half of the VCU. These areas are surrounded by frequently dissected footslopes and mountainslopes. The soils overlie compact till that restricts drainage and reduces productivity.

The western part of the VCU has steep slopes, well-drained soils, and relatively high productivity. Although areas of compact till are present in these areas, the reduction in drainage and productivity is lessened by the steeper slope gradients.

About 2,200 acres of timber harvest and road construction have taken place in this VCU. Of the total, 107 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.

VCU 245: VCU 245 is comprised of 23,834 acres and includes an extensive section of coastline along Peril Strait. It contains a major stream system (Alaska Department of Fish and Game Anadromous Stream, Catalog Number 113-51-10040) in the vicinity of False Island and several smaller ones along the coastline of Peril Strait. Much of the northern side of the VCU and parts of the western portion consist of oversteepened alpine mountainslopes and rounded alpine summits.

The only major riparian zone is located along this major stream system near False Island. This zone consists of floodplains, alluvial fans, and footslopes containing alluvial soils and supporting a climax spruce forest. A large, sparsely vegetated mudflat is located at the mouth of this stream system. The upper reaches of the stream system are surrounded by areas of ex-

treme mass movement hazard. These areas are comprised of very steep mountainslopes influenced by snow avalanches and mass wasting, and mountainslope ravines. They support a coniferous forest/alder shrubland complex. Similar areas are also common along the entire northern boundary of the VCU.

Highly productive hemlock forests are present on the well drained footslopes and well-drained broken mountainslopes located along the shoreline in the eastern half of the unit. In the western half of the VCU, the low elevation mountainslopes contain well drained but shallow soils and support a moderately productive coniferous forest.

Wetland soils are not common in VCU 245 and those that are present are located almost entirely in the western half of the unit.

About 4,075 acres of timber harvest and road construction have taken place in this VCU. Of the total, 348 acres of harvest units and roads have been located in soil types recently classified as being of concern for mass wasting potential. These areas were identified in the 1986-90 FEIS as extreme mass wasting hazard soils.



Yellow Skunk-cabbage, Lysichiton americanum Hult. and St. John

Vegetation

Western hemlock-Sitka spruce forests dominate the overstory of the Southeast Alaska rain forest. The understory is composed of shrubs such as red huckleberry, rusty menziesia, and devil's club; and the forest floor is covered with a mat of mosses, liverworts, and plants such as deerheart, bunchberry dogwood, single delight, and skunk cabbage. Streamside riparian vegetation is characterized by salmonberry, devil's club, alder, grasses, ferns and currants.

Muskegs, dominated by sphagnum mosses, sedges, and shrubs of the heath family, are interspersed among low elevation timber stands where drainage is restricted. Trees are sparse and consist mainly of stunted hemlock, lodgepole pine, and Alaska-cedar.

Common marine plants in near-shore waters include brown, red, and green algae, and eel-grass. Tide flats are found at the heads of many of the bays and estuaries and are usually associated with stream estuaries. The tide flats generally support sea milkwort, glasswort, and algae. Beach meadows occur between the shore and the forest. Lower beach meadows are composed of beach ryegrass, reed bent grass, hairgrass, fescue grass, beach lovage, goose tongue, and sedges. Upper beach meadow plants include yarrow, bedstraw, starwort, ferns, western columbine, and cow parsnip. Oregon crabapple, alder, devil's club, and blueberry occur along the border of the beach meadow and the forest.

At elevations generally above 2,000 feet, the plant communities are characterized by low shrubs, grasses, and sedges. Subalpine forests and meadows occur at the interface between the forested communities and the alpine tundra.

Threatened and Endangered Species

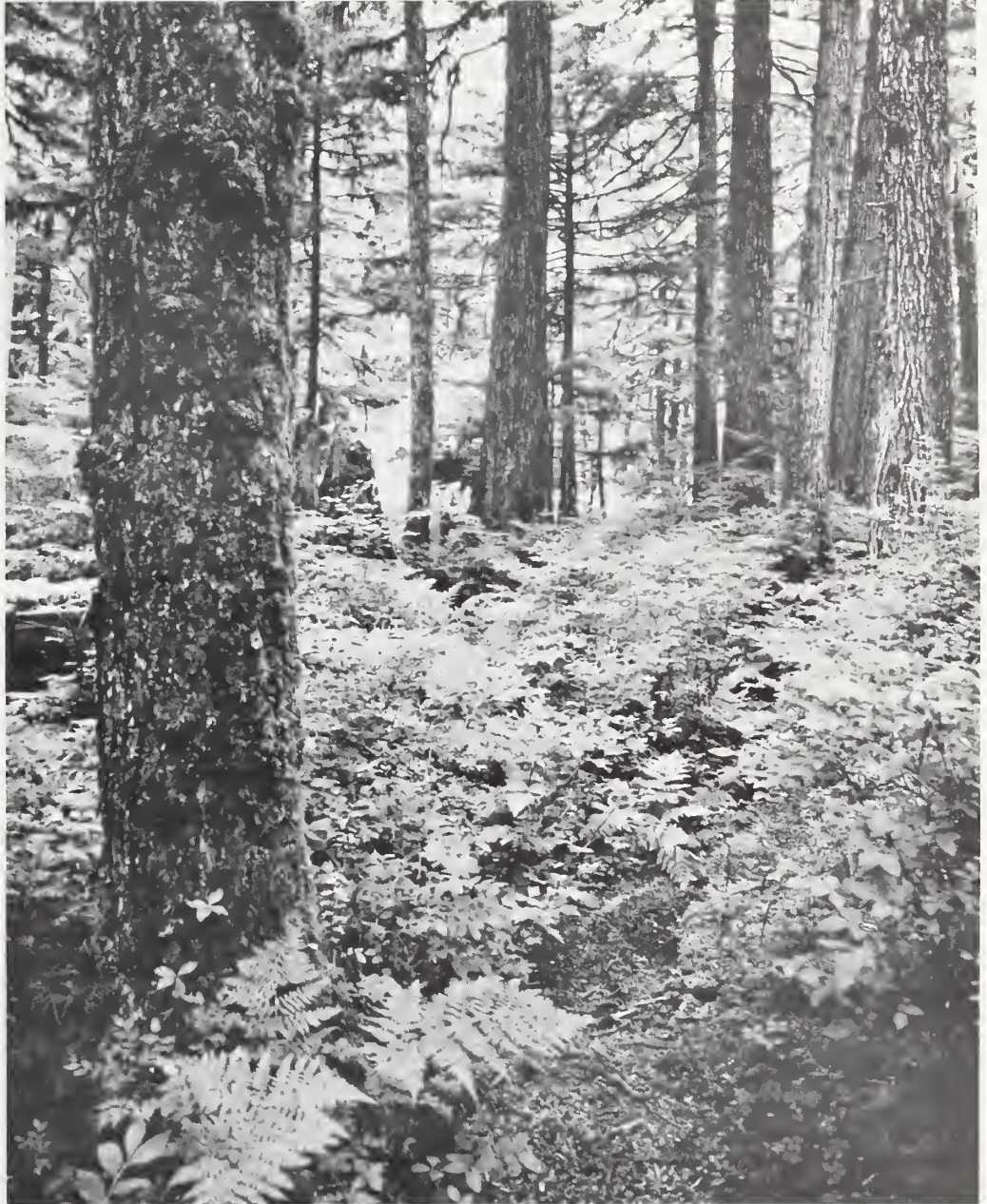
Currently there are no plant species located in the APC Contract area that are listed nor that are candidates for listing by the US Fish and Wildlife Service as threatened or endangered. Murray and Lipkin (1987) list none for Southeast Alaska.

Timber

Western hemlock and Sitka spruce dominate timber stands throughout Southeast Alaska and Analysis Area 6. Other timber species include Alaska-cedar (also known as yellow-cedar), mountain hemlock, red alder, and lodgepole pine.

Western hemlock and Sitka spruce develop best on well drained valley bottoms and lower slopes. However, they also occur anywhere between sea level and timberline. Both are harvested for commercial purposes.

*Mature and Overmature
Forest Stand*



Alaska-cedar occurs in limited numbers in stands throughout the APC Contract area and is a highly valued commercial species. Alaska-cedar is mostly found in muskegs and on low volume sites (Volume Class 4: 8 to 20 MBF/acres) where competition is less. Recent data indicate that Alaska-cedar comprises 4 percent of Volume Class 4 stands and 1 percent of Volume Class 5 stands. This species is able to grow on extremely poor soil if moisture is abundant. See the following section on commercial forest land for definitions of volume classes.

Noncommercial species include red alder, which is often found along beaches and streams and on steeper slopes where soils have been highly disturbed, such as logging unit landings, spur roads, and cable roads. Lodgepole pine (also called shore pine) is found in muskegs.

Much of the commercial forest land in the Tongass National Forest that has not been previously harvested has been undisturbed for centuries and is considered mature or overmature.

**Mature and
Overmature Timber**

These stands are also commonly referred to as climax plant communities, or old-growth forests. In this document, "old-growth forest" refers to a 1986-90 Plan habitat type prescription of some mature and overmature stands. The affected "old-growth forest habitat" environment is discussed in the Wildlife section of this chapter.

Mature and overmature stands have an uneven appearance because they contain trees of many ages, sizes and condition, with many dead tops and snags. In contrast, stands that have been disturbed during the last 100 to 200 years by fire, landslide, windthrow, or logging have a more uniform appearance because they contain trees of relatively uniform age and size with fewer snags and defective trees. Even-aged stands convert to uneven-aged stands as insects, disease, wind, and ice weaken and kill trees, opening up the stand for new growth to enter. The change from even-aged to uneven-aged to all aged is a continuing process. Harvested mature stands are returned to even-aged stands as they regenerate.

Based on past forest inventories, overmature stands are assumed to have reached an equilibrium in productivity, where they no longer increase in biomass. Establishment of new trees depends on the death of existing trees, which provides space in the stand and sunlight through the canopy. Although most of the timber in mature and overmature stands is of declining commercial quality, but suitable for the production of pulp, Sitka spruce and Western hemlock in mature stands also provide some of the finest quality commercial timber for lumber.

Commercial Forest Land

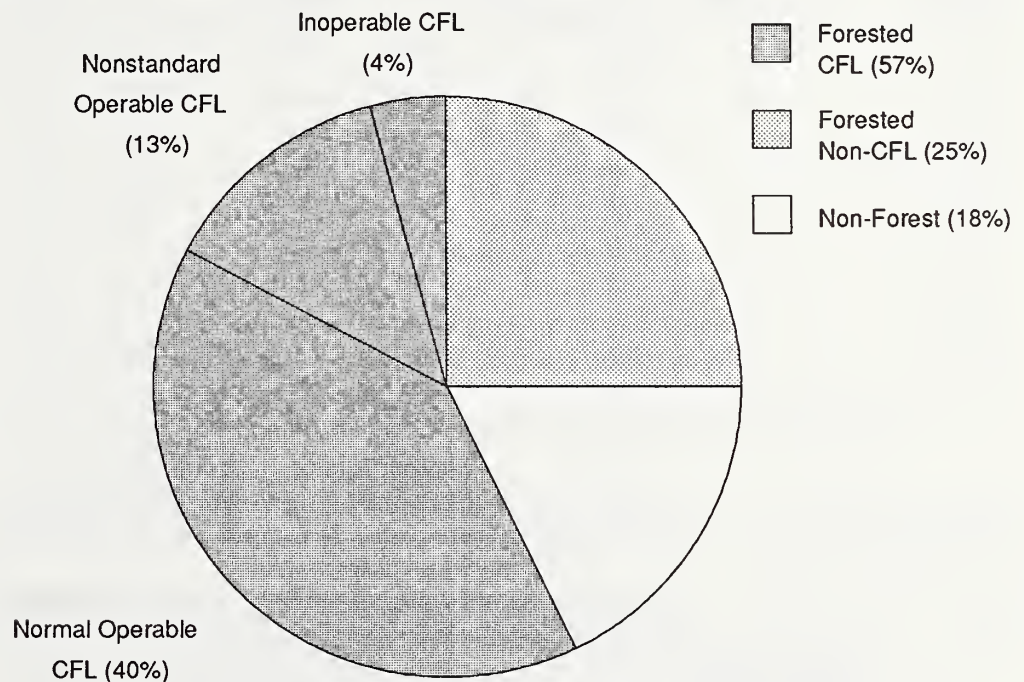
Depending on its vegetative cover, land in the Tongass National Forest has been categorized as commercial forest land (CFL), noncommercial forest land, or nonforest (Figure 3-1). Information on this figure and the following estimates include both National Forest land and Native lands within external boundaries of the Tongass National Forest. About 57 percent of the land in Analysis Area 6 consists of CFL, which is land producing or capable of producing continuous crops of timber and that has not been withdrawn from the timber base by statute or administrative action. The Forest Service has specified that in order to be capable of commercial timber production, the land must be able to produce 20 cubic feet/acre/year, or have 8 thousand board feet (MBF)/acre of net timber volume (Forest Service 1978). Mature, overma-

Choker Setters Adjust the Choker on a Log Being Prepared for Yarding to the Landing



Figure 3-1

Percentage of Timber Land Types in Analysis Area 6



SOURCE: Tongass Land Management Plan aerial photo points inventory, Forest Service Region 10, Juneau, AK.

ture, and second-growth stands, as well as areas that have been logged and/or regenerated, may qualify as CFL. Commercial forest land also includes accessible and inaccessible areas.

Non-CFL makes up about 25 percent of Analysis Area 6. Non-CFL is forested land that is not capable of producing commercial quantities or has been withdrawn from the timber base. The remaining 18 percent of Analysis Area 6 is classified as nonforest and includes salt marshes and estuaries, alpine areas, and nonvegetated mountain tops.

Commercial forest land in the Tongass National Forest has been classified into volume classes. Each volume class represents a range of timber volume per acre. Placing the timber in volume classes allows the Forest Service to roughly estimate the volume for each VCU. Volume Classes 1 through 3 include CFL containing less than 8 MBF/acre. Volume Class 1 includes nonstocked stands that have been recently burned or logged. Seedling/sapling stands with less than 8 MBF/acre are placed in Volume Class 2, and pole timber stands with less than 8 MBF/acre are placed in Volume Class 3. Timber in Volume Class 4 contains 8 to 20 MBF/acre; in Volume Class 5, 20 to 30 MBF/acre; in Volume Class 6, 30 to 50 MBF/acre; and in Volume Class 7, greater than 50 MBF/acre. Table 3-1 shows the acres of CFL in Volume Classes 4 through 7 in Analysis Area 6, by VCU.

Operable and Inoperable CFL

Commercial forest land is further classified as inoperable CFL, normal operable CFL, or nonstandard operable CFL (see Figure 3-1 for the distribution in Analysis Area 6). Inoperable stands are those in which potential resource damage or physical limitations make harvest of trees or impractical and/or uneconomical. The primary difference between normal operable and nonstandard operable CFL is that normal stands have less potential for erosion and slope failure than nonstandard stands.

Table 3-1

Commercial Forest Land by Volume Class in Acres

VCU	Volume Class ¹			
	4	5	6	7
235	7,057	6,284	4,350	0
236	1,490	2,583	1,292	0
237	1,933	1,571	967	0
238	2,034	2,939	339	0
239	3,597	2,484	1,285	0
240	2,228	1,114	637	0
241	1,160	2,126	97	0
242	2,185	3,141	1,229	0
243	7,709	4,688	1,250	0
244	1,895	1,158	632	0
245	3,347	4,767	3,347	0
Total	34,635	32,855	15,425	0

SOURCE: Tongass Land Management Plan aerial photo points inventory, USFS Region 10, Juneau, AK, and SEIS Planning Record.

¹ Volume Classes 1 through 3 (not presented) contain less than 8 MBF/acre; Volume Class 4 contains 8-20 MBF/acre; Volume Class 5 Contains 20-30 MBF/acre; Volume Class 6 contains 30-50 MBF/acre; and Volume Class 7 contains 50 or more MBF/acre.

Because of their lower erosion potential, normal operable stands may be logged using common systems, including 1,250-foot highlead; 1,000-foot short-span skyline; 1,000- to 2,000-foot intermediate-span skyline; 2,000- to 2,600-foot long-span skyline; cold-deck and swing; track-loader (including yarder-loader) or A-frame. Logging nonstandard operable stands could result in soil erosion or slope failure if careful logging techniques are not used. Nonstandard yarding techniques, which result in less impact on soils than highlead logging systems, may be employed to log nonstandard operable stands. Nonstandard techniques include: multi-span skyline, long-span skyline over 2,600 feet, and helicopter yarding systems.

Timber Harvested

Most of the timber harvested to date and planned for harvest in the Tongass National Forest and in Analysis Area 6 has been from mature or overmature stands. Occasionally, second-growth stands (younger, even-aged stands that grew after removal of the previous timber stand) originating from wind or landslide disturbance are harvested. Commercially harvested species include western and mountain hemlock, Sitka spruce, and Alaska-cedar. Table 3-2 provides a summary of the timber acreage harvested during each five-year period and to date in Analysis Area 6.

Concern for protecting resources other than timber, including soils, water quality, fish and wildlife habitat, and visual resources, limit the acreage that may be harvested within 20-year increments. The Alaska Regional Guide (Forest Service 1983a) explains the Tongass National Forest Policy for these resources. Options for road locations and the need to provide economically feasible harvest units also place limitations on the amount of timber that can be harvested.

Silvicultural Treatments

Regeneration is the process of establishing a new crop of trees on the harvested units. Beginning in 1976, regeneration has been certified by a silviculturist in the Tongass National Forest. Regeneration of a harvest unit may be certified when the it is adequately stocked with healthy young trees, usually within three to five years after a stand has been harvested. Analysis Area 6 reforestation records contain data on harvest units logged between 1954 and 1986, totaling 13,980 acres. Of this total, 12,931 acres are being reforested by natural seeding, and

Table 3-2

Past Timber Harvest in Acres (TLMP)

VCU ¹	Pre-1981 Harvest	1981-1986 Harvest	1986-1990 Harvest ²	Total Harvest
235	198	0	0	198
236	1,339	101	108	1,656
239	1,162	64	528	1,553
241	715	0	0	715
242	1,207	0	0	1,207
243	2,931	0	0	2,931
244	2,198	0	0	2,198
245	4,065	0	0	4,065
Total	13,815	165	436	14,523

SOURCE: Tongass Land Management Plan aerial photo points inventory, USFS Region 10, Juneau, AK.

¹ No harvest has taken place in VCUs 237, 238, and 240.

² Column represents acres harvested prior to signing of the ROD.

Foreground is 8-12 Year Old Second Growth, Middle Ground is Aquatic Habitat Management Unit, Background is Recent Harvest



Timber Volume Available

1,049 acres have been hand planted. Over 97 percent of all the acres examined have been certified for regeneration. Stands that have been harvested between 1985 and 1988 are expected to have enough natural regeneration to be certified by 1993.

In Analysis Area 6, 901 acres have been precommercially thinned. Precommercial thinning is the selective removal of trees from second-growth stands 12 to 20 years old. Thinning is conducted to reduce competition among the trees in the stand, causing the remaining trees to grow faster and larger. Precommercial thinning also benefits other resources such as wildlife by allowing more light to reach the forest floor, increasing understory production.

The Federal District Court decision of June 24, 1987 (*Tenakee Springs v. Courtright*) resulted in a deferral of timber harvesting in certain parts of the APC Contract area. In Analysis Area 6, harvest in VCUs 237 and 238 has been deferred, pending completion of the Supplemental EIS.

Since preparation of the Phase I SEIS began on December 7, 1987, harvesting of timber has continued on certain nondeferred units. Table 3-3 provides the acreage of timber in Analysis Area 6 available to APC as of September 1, 1988 that can be harvested before the Record of Decision (ROD) is filed for this SEIS. All but three of these units are projected to be harvested prior to this ROD.

Timber Harvest Modifications from APC 1981-86 ROD and APC 1986-90 ROD

The *Tenakee Springs v. Courtright* decision has required the Forest Service to document in this SEIS any changes in timber harvest from what was planned in the Records of Decision for the APC 1981-86 and 1986-90 Final EISs. In addition, the Forest Service is required to evaluate any environmental impacts resulting from such changes. For Analysis Area 6, no changes are recorded in timber harvest units.

Roads

Analysis Area 6 contains no public transportation facilities (state highways, ferry docks, or airports) and current Southeast Alaska transportation development plans do not include any such facilities within the foreseeable future (Alaska Department of Transportation and Public Facilities 1976). There are no established communities in Analysis Area 6. There is one active logging camp at Corner Bay. A few roads access the interior of the area, but are not linked to any inter-island transportation network. Consequently, timber harvest and related National Forest management activities are the primary purposes for transportation development. APC does not have a policy restricting camp residents from using their own vehicles in Analysis Area 6. Due to the high cost of transporting a conventional vehicle, however, few vehicles other than logging company vehicles are found in Analysis Area 6. All terrain vehicle (ATV)

Table 3-3

Timber Volume Available from Nondeferred and Partially Deferred VCUs

VCU	Timber Available 8/1/89	
	<i>Acres</i>	<i>Volume (MBF)</i>
236	128	2,060
239	140	3,566
Total	268	5,626

SOURCE: Hoonah Ranger District unit status database, Hoonah, AK.

Table 3-4
Existing Roads in Miles

VCU	Existing	Court Authorized	VCU Total
235	5.6	0	5.6
236	13.6	1.2	14.8
237	0	0	0
238	0	0	0
239	13.2	4.3	17.5
240	0.4	0	0.4
241	8.5	0	8.5
242	15.6	0	15.6
243	30.1	2.5	32.6
244	17.2	0	17.2
245	29.2	0	29.2
Totals	133.4	8.0	141.4

SOURCE: SEIS Planning Record.

use may occur in Analysis Area 6, although the Forest Service currently has no data on how much or where ATV use occurs.

Currently, there are about 113 miles of roads in Analysis Area 6 (Table 3-4). Existing roads in VCUs 235, 236, and 239 connect to the Corner Bay LTF and logging camp in VCU 236 and to the Kook Lake recreational cabin in VCU 239. Roads in VCUs 240, 241, 242, 243, 244, and 245 interconnect the Sitkoh Bay, False Island, and Todd log transfer facilities. Currently, there is no road connection between the Corner Bay road system and the road system serving False Island and Sitkoh Bay in the southern portion of the analysis area.

Log Transfer Facilities, Logging Camp, Administrative Sites

There are five log transfer facilities in Analysis Area 6. The Sitkoh Bay West LTF is currently inactive and is not proposed for use under any of the alternatives; therefore, it will not be discussed further.

The Sitkoh Bay East LTF was constructed in 1975 and has been inactive for approximately ten years. The US Forest Service holds current permits for this facility, which specify that it be operated as an A-frame facility with a timber bulkhead designed to allow low-velocity entry of logs into the water.

The Todd LTF was constructed in 1974. It has been inactive since 1975 or 1976. The current permits for this facility also specify an A-frame design.

The False Island LTF, which was constructed in 1965, has been inactive for approximately 13 years. False Island was originally constructed as an A-frame facility, although there is no restriction on the type of facility on the current permits held by the Forest Service.

The Corner Bay LTF was constructed in 1974 as a steep-angle slide facility but is to be re-constructed as a low-angle slide facility designed to skid log bundles directly into the water. The Corner Bay LTF is currently in use and is being maintained as a slide facility. The Corner Bay LTF is proposed for use under all of the alternatives.

Log Raft in Tow



There is an existing logging camp at Corner Bay. This camp is currently being expanded and is expected to be occupied year-round. When expansion is completed this season, the population may reach 100 persons (depending on the size of the families that live there). Families would be housed in up to 16 trailer houses. Single men would be housed in the one bunkhouse currently on the site. Most of the population would leave in the winter, leaving a year-round population of approximately 30 persons. If there are enough children, a one-room school would be operated at Corner Bay. The contractor also plans to build a gym for the logging camp residents.

Historically, there has been a logging camp at False Island; however, most of the facilities were removed shortly after the LTF became inactive. The area was used as a Young Adult Conservation Corps (YACC) camp for a while. The YACC workers built three two-story buildings, which were used as bunkhouses and one mess-hall. In addition to these structures, there are also two prefabricated buildings used as workshops and for wood storage. The Southeast Alaska Regional Health Corporation will be moving into these buildings with a drug rehabilitation program under a special use permit from the Forest Service. The population of False Island should average about 12 to 15 with a maximum of 30 people involved in the drug rehabilitation program. They plan to occupy the area on a seasonal basis, leaving only a caretaker there during the winter months.

If an alternative that requires use of the False Island logging camp is selected, then these existing structures will also be used by the Forest Service as an administrative site. Trailer houses would be moved into an adjacent area to house people involved in the harvest activities. The logging camp would probably have a population of approximately 80 during the harvest season and a smaller population through the winter months.

Associated with the logging camp at Corner Bay is a Forest Service Administrative site. It consists of a self-contained building that can accommodate about 15 people. It is closed during the winter and is generally only occupied on weekdays during the logging season. It is not available for recreational use.

There is also an administrative cabin on Sitkoh Lake that can accommodate two to four people, and it is available for recreational use under a reservation system.

There are four cabins on Kadshan Bay in VCU 235 that are operated by various state and federal agencies, including the Forest Service, for research purposes. There are also several cabins on Trap Bay in VCU 237 that are used for research purposes by the Forest Service and the National Marine Fisheries Service.

Wildlife

Alaska's fish and wildlife are valuable for aesthetic, economic, recreational, and subsistence purposes. Visitors come from all over the world to view bald eagles, spawning salmon, mountain goats, and other wildlife species in Southeast Alaska. Over 300 species of birds, fish, and mammals occur in the Tongass National Forest.

Many wildlife species exist within the Contract area and occupy a diverse range of habitats. However, not all the species that occur in the Contract area will be affected by the proposed actions or alternatives. Therefore, to identify effects on wildlife, several types of studies and inventories have been conducted.

Wildlife habitats were identified in the analysis area. Habitat refers to the kind of environment in which a species occurs. This environment can be described in physical or biological terms, which often includes elevation, topographic position, or type of vegetation community. A species may occupy a range of different habitats, or more than one distinctive kind of habitat in different seasons. Habitats identified in previous forest management plans and used in this document include: old growth, forested, deer winter range, inland wetland, beach fringe, estuarine fringe, and streamside riparian. An acreage inventory of each habitat by VCU is included below in the Emphasis Habitats section.

Several wildlife species that use those habitats were identified for additional evaluation. These animals were named emphasis species due to their importance in the overall area, both to the ecosystem and humans. The emphasis species selected for this analysis were identified during development of the 1986-90 APC Contract area plan. The species selected include: Sitka black-tailed deer, brown bear, pine marten, land otter, bald eagle, and Vancouver Canada goose.

Information obtained from the habitat inventory, literature review, and resource agency records provided the basis for an emphasis species evaluation. The Sitka black-tailed deer and pine marten evaluations included use of a habitat capability model. The models use biological and habitat information unique for each species to estimate the capability of a given habitat to support a population. Information provided by each model allows land managers and resource agency personnel to evaluate existing habitat capabilities and predict the relative effects of a proposed land management activity.

Several types of wildlife habitat (the Emphasis Habitats) were inventoried and analyzed in the APC 1981-86 and 1986-90 FEISs. Two noninventoried habitats discussed in the FEISs include alpine/subalpine and old growth.

Subalpine habitat is the upper edge of forested areas (within 1,000 feet) adjoining alpine areas. This habitat is important summer range for deer and bear. Alpine/subalpine habitat is not included in this analysis because timber is not harvested there, and it would be essentially unaffected during the 1986-90 Operating Period.

Certain wildlife such as Sitka black-tailed deer are reported to be old-growth dependent species. Therefore, to recognize its importance, old-growth habitat was introduced in the 1986-90 FEIS as a management prescription. Further discussion of old-growth habitat characteristics is included below. The prescribed management acreage and effects of the proposed harvest alternatives can be found in Chapter 4.

Forested habitat includes all areas with forest cover and has not been identified as an emphasis habitat. All other habitats evaluated in this EIS are located within the forested habitat.



Grouse

Wildlife Habitats

Many wildlife species, including those dependent on old growth, make use of all forested areas within the study area. Therefore, while the other habitats have been delineated because of specific attributes or management concerns, the forested habitat is presented to disclose general overall effects on carrying capacity for old-growth dependent species (Forest Service 1986b, pp. 3-22 and 3-23).

Emphasis Habitats

Emphasis habitats inventoried since the Tongass Land Management Plan for Analysis Area 6 include deer winter range, inland wetland, beach fringe, estuarine fringe, and streamside riparian. The inventory was predominantly obtained from mylar maps developed during the analysis for the EIS for the 1986-90 Operating Period. Mylar maps were prepared with the help of topographical maps and aerial photos.

Tongass Land Management Plan data were used for VCUs 240, 241, 244, and 245 because wildlife inventories were not completed for the 1986-90 FEIS analysis and no timber harvest was planned for these VCUs. The Tongass Land Management Plan data were collected in a similar, but not identical, manner as the 1986-90 FEIS inventories and are used where 1986-90 FEIS inventory data are not available.

Table 3-5 lists the estimated amount of wildlife habitat prior to any timber harvest. If the 1986-90 habitat mylars indicated a particular habitat (for example, deer winter range) is present on either side of an existing clearcut unit, the acreage of the clearcut unit was assumed to have been deer winter range and added into the total for deer winter range presented in the table. The data in Table 3-5 are used as a baseline for calculating the amount of habitat converted to second-growth timber management. It is important to recognize that when trees are harvested from a habitat, a habitat still exists. However, it is converted to second-growth timber management and does not have the same conditions that previously existed.

Table 3-5

Existing Acres of Wildlife Habitat Prior to Recorded Timber Harvest

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
235	27,178	3,150	102	455	697	1,939
236	8,629	1,670	15	309	250	349
237	4,590	1,301	67	549	189	120
238	6,360	1,120	0	345	61	726
239	12,527	1,903	264	600	30	605
240 ¹	7,003	160	148	116	120	1,090
241 ¹	5,605	1,010	155	355	0	490
242	8,478	1,924	0	425	60	307
243	19,614	3,338	0	720	319	585
244 ¹	10,314	70	336	36	0	875
245 ¹	19,574	4,540	26	1,778	200	1,080
Total	129,872	20,186	1,113	5,688	1,926	8,166

SOURCE: 1986-90 FEIS (Forest Service 1986b) and SEIS Planning Record.

¹ Tongass Land Management Plan data is used since subsequent wildlife inventories have not been completed for the VCUs that are not scheduled for timber harvest. The Tongass Land Management Plan data were collected in a similar, but not exactly the same manner as the subsequent wildlife inventory data.

Table 3-6 shows the wildlife habitat acreage where timber was previously harvested or will be harvested by Court authorization through December 31, 1990. This includes logging that occurred under the Long-Term Timber Sale Contract and as well as earlier logging since the 1950s, although some harvesting took place as early as 1918. Generally, less than 35 percent of the habitats have been harvested. Notable exceptions include VCU 241 where 56 percent of the deer winter range has been harvested. In addition, 39 percent and 37 percent of the inland wetland habitat from VCUs 235 and 244 has also been harvested. In the beach fringe habitat, 44 and 26 percent has been harvested in VCUs 241 and 243. The estuarine fringe and streamside riparian habitats show timber harvest of 50 percent and 36 percent in VCU 239, 60 percent and 45 percent in VCU 243, and 70 percent and 75 percent in VCU 245. The streamside riparian habitat in VCU 236 also shows timber harvest of 48 percent. These historic

Table 3-6
Wildlife Habitats Harvested to 1990¹

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acres</i>						
235	198	61	40	0	7	18
236	1,656	75	3	91	60	169
237	0	0	22	0	0	0
238	0	0	— ²	0	0	0
239	1,553	452	32	35	15	218
241	715	570	0	155	— ²	5
242	1,207	254	— ²	18	0	10
243	2,931	1,153	— ²	331	191	264
244	2,198	0	125	0	— ²	285
245	4,065	1,365	0	425	140	810
Total	14,523	3,930	222	1,055	413	1,779
<i>Percent</i>						
235	1	2	39	0	1	1
236	19	4	20	29	24	48
237	0	0	33	0	0	0
238	0	0	— ²	0	0	0
239	12	24	12	6	50	36
241	13	56	0	44	— ²	1
242	14	13	— ²	4	0	3
243	15	35	— ²	46	60	45
244	21	0	37	0	— ²	33
245	21	30	0	24	70	75
Total ³	11	19	20	19	21	22

SOURCE: 1986-90 FEIS (Forest Service 1986b) and SEIS Planning Record.

¹ Includes Court authorized timber harvest through the 1989 harvest season.

² None of this habitat was found in the inventory.

³ This value represents the percent of pre-harvest habitat affected in the entire analysis area.

timber harvest figures within the wildlife habitats of Analysis Area 6 reflect a pre- and post-TLMP shift in management emphasis. TLMP established these wildlife habitat categories and recognized the need to reduce the amount of timber harvest to be scheduled within them to meet wildlife needs. Table 3-2 shows that almost 99 percent of all harvest within this Analysis Area took place prior to TLMP. The salvage of the blowdown timber accounts for most of the remaining 165 acres of harvest since TLMP.

Table 3-7 shows the acreage and percentage of each habitat that would remain following Court-authorized harvest activities through December 31, 1990. In many cases, at least 70

Table 3-7

Wildlife Habitats Remaining After 1986-90 Authorized Timber Harvest

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acres Remaining</i>						
235	26,980	3,089	62	455	690	1,921
236	6,973	1,595	12	218	190	180
237	4,590	1,301	45	549	189	120
238	6,360	1,120	— ²	345	61	726
239	10,974	1,451	232	565	15	387
240 ¹	7,003	160	148	116	120	1,090
241 ¹	4,890	440	155	200	— ²	485
242	7,271	1,670	— ²	407	60	297
243	16,683	2,185	— ²	389	128	321
244 ¹	8,116	70	211	36	— ²	590
245 ¹	15,509	3,175	26	1,353	60	270
Total	115,349	16,256	891	4,633	1,513	6,387
<i>Percent Remaining</i>						
235	99	98	60	100	99	99
236	81	96	80	71	76	52
237	100	100	67	100	100	100
238	100	100	— ²	100	100	100
239	88	76	88	94	30	64
240	100	100	100	100	100	100
241	87	44	100	56	— ²	99
242	86	87	— ²	96	100	97
243	85	65	— ²	54	40	55
244	79	100	63	100	— ²	67
245	79	70	100	76	30	25
Total ³	89	81	80	81	79	78

SOURCE: 1986-90 FEIS (Forest Service 1986b) and SEIS Planning Record.

¹ These areas were not designated in the 1986-90 study area.

² None of this habitat was found in the inventory.

³ This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

percent of the habitats would remain, and in some cases 100 percent would remain in each VCU. The percent of habitats remaining by 1990 reflects only authorized harvest activities and does not include currently proposed actions (Phase I-Draft SEIS Alternatives, Forest Service 1988a).



Deer Winter Range

Deer Winter Range

The limiting factor for Sitka black-tailed deer carrying capacity is deer winter range. The attributes of low-elevation old-growth stands that constitute deer winter range have been documented by Walimo and Schoen (1980). Those attributes include proper canopy cover, understory, slope, aspect, distance to saltwater, and elevation. Though an array of habitat choices is available in Southeast Alaska, these habitats vary in their ability to meet the changing seasonal requirements of the deer. During the summer and early fall, deer in Southeast Alaska use habitats that include clearcuts, alpine, and low- and high-volume old-growth forest. Throughout winter and early spring, however, deer use old growth almost exclusively (Schoen et al. 1985). Schoen further indicates that during winters with deep snow, deer prefer high-volume old growth over all other habitats.

A study conducted on Vancouver Island (McNay and Doyle 1987) indicated that black-tailed deer habitat use varied depending on seasonal movement behavior. Conclusions reached in this study might apply to Southeast Alaska, because habitats on Vancouver Island are representative of a coastal environment. Radio-collared deer were studied over five years to identify seasonal movement strategies and winter habitat selection. Movement strategies were divided into migrators and nonmigrators (residents). Seasonal home ranges of migratory deer were found to be significantly larger than those of resident deer and they tended to use all habitat types within their respective home ranges. Most resident deer were found to use only the pole-sapling habitats within the Douglas-fir conifer type.

McNay and Doyle (1987) also found that habitat use during specific winter weather conditions varied depending on weather severity. During heavy snow accumulation and cold temperatures most deer reduced their home range size and were forced to seek out the closest forested habitat. Home range sizes became more variable and most deer tended to prefer early successional habitats during mild weather. Both migrating and resident deer used all habitats available to them within the boundaries of their seasonal home ranges. Individual deer appeared to be relatively inflexible in their responses to habitat changes: resident deer being the least capable of dealing with catastrophe. Because migrating deer use a greater diversity of habitats within a larger home range, they appeared to be more capable of dealing with extreme conditions. It is arguable that the McNay and Doyle (1987) findings, in total or in part, have direct applicability to the environment in Analysis Area 6.

Deer winter range is essential to deer under severe or moderately severe winter conditions. Severe winters are described as sea level snow accumulations exceeding 30 centimeters (11.8 inches) for four or more months (Hanley, et. al. 1984). In severe winters, deer are confined to winter range habitat where it is available, or are forced to the beach fringe. Their movements are then restrained by deep and persistent snowpack; food plants become harder to obtain and available plants are overbrowsed; and in some years, large numbers of deer die (Forest Service 1986b, p. 3-21).

Moderately severe winters are those where snow accumulations range from 10 to 30 centimeters (3.9 to 11.8 inches) for four or more months. In moderately severe winters, deer require the use of winter range habitat, but most of the time they can move about within the habitat area. Sufficient food plants are available for all or most of the deer to survive. Under moderately severe winter conditions, habitat quality and abundance are the key to survival for deer (Forest Service 1986b, p. 3-21).

There have been three severe and two moderately severe winters since 1969. The three severe winters were between 1969 and 1973 and were considered to be the cause of the major deer population declines throughout Southeast Alaska. Relatively mild winters since then have allowed most deer populations throughout the APC Contract area to rebound to previous high levels.

In 1982, the Forest Service appointed an internal Task Force to define habitat that is considered Sitka black-tailed deer winter range. The Task Force included individuals from the Wildlife, Watershed, and Timber Management Departments. Further input from Alaska Department of Fish and Game along with several research papers provided the basis for a procedure to identify and inventory those habitats (Schoen 1978, Schoen, et al. 1979, 1981, Forest Service 1986f). The final delineation and ranking of deer winter range was based on both vegetation and physical parameters. Physical parameters included elevation and distance from saltwater. Vegetation parameters in two categories included stand type that influenced snow interception and stand type relating to forage needs.

Table 3-7 indicates the effect of planned timber harvest activities authorized through December 31, 1990 on deer winter range. The percentage of remaining habitat spans from a low of 44 percent in VCU 241 to 100 percent in four VCUs. Two of the VCUs will have greater than 95 percent remaining deer winter range. Approximately 20,000 acres of deer winter range existed prior to any recorded harvest activities. Of that, approximately 16,000 acres or 81 percent will not be impacted by harvest activities scheduled through December 31, 1990.

Inland Wetland

These areas are not necessarily wetlands as defined by the US Fish and Wildlife Service (Cowardin, et al. 1979). Rather, inland wetland habitat is defined as forested areas within 500 feet of low elevation lakes, beaver ponds, marshlands, and associated grass/sedge meadows that are larger than 10 acres. These sites are especially important for bears, furbearers, certain waterfowl, and a variety of other birds. Areas inventoried for the inland wetland habitat did not include many small wetland areas that account for much of the existing wetlands.

Table 3-5 indicates approximately 1,100 acres of inland wetland habitat existed in Analysis Area 6 prior to any recorded timber harvest. Of that total, approximately 900 acres or 80 percent will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-7).

Beach Fringe

Forested areas within 600 feet of the ocean are transition zones between land and water, salt and freshwater, and vegetated and nonvegetated conditions (Forest Service 1979b). Forested areas in this transition zone receive heavy use by species with high economic, recreational, subsistence, or aesthetic values. Brown bear, river otter, bald eagle, pine marten, black-tailed deer, and Vancouver Canada goose are typical species that concentrate their activities during some or all seasons in these forest stands. Many of these species exhibit a preference for, or dependence on, mature/overmature forest stands.

Table 3-5 indicates approximately 5,700 acres of beach fringe habitat existed in Analysis Area 6 prior to any recorded timber harvest. Of that total, approximately 4,600 acres or 81 percent will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-7).

Estuarine Fringe

Bears, waterfowl, furbearers, and bald eagles are all primary users of the estuarine fringe habitat. Although timber harvest activities have been minimal within the actual estuarine habitat, it is the timbered zone bordering estuarine habitat that is evaluated here. A 1,000-foot timbered zone around estuarine areas was identified in the Tongass Land Management Plan Wildlife Task Force Working Report (Forest Service 1979b) and was used in the 1986-90 FEIS (Forest Service 1986b, p. 3-22) to quantify alteration of habitat. The forested estuarine fringe is similar to beach fringe, but due to species diversity it has a greater value to wildlife; especially brown bears, river otters, bald eagles, and waterfowl.

Table 3-5 indicates approximately 1,900 acres of estuarine fringe habitat existed in Analysis Area 6 prior to any recorded timber harvest. Of that total, approximately 1,500 acres, or 79 percent, will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-7).

*Beach and Estuarine Fringe
Habitat*



Streamside Riparian

Forested areas within 500 feet of anadromous salmon spawning areas, as recommended in the Tongass Land Management Plan Wildlife Task Force Working Report (Forest Service 1979b), are called streamside riparian habitat zones. These areas are used primarily by eagles, furbearers, and brown bears (Forest Service 1986b, p. 3-22).

Table 3-5 indicates approximately 8,200 acres of streamside riparian habitat existed in Analysis Area 6 prior to any recorded timber harvest. Of that total, approximately 6,400 acres, or 78 percent, will remain unaffected by harvest activities scheduled through December 31, 1990 (Table 3-7).

*Historic Photo of Overmature
Hemlock Forest*



Old-Growth Forest

Much of the forest in Analysis Area 6 can be considered old growth since it has been largely unaffected by timber harvest windthrow or fires. This habitat type is characterized as stands of trees usually well past the age of maturity, with declining growth rates and signs of decadence, such as dead and dying trees, snags, and downed woody material. The stand usually includes large diameter trees, multi-layered canopies, a range of tree diameter sizes, and the notable presence of understory vegetation. These forests are in a dynamic, steady-state where the death of old trees is balanced by the growth of new trees.

Old-growth forests have broken, multilayered canopies through which sunlight penetrates to the forest floor. The forest floor is typically carpeted by an abundance of ferns, mosses, herbs, and shrubs. Lichens and fungi add to the diversity, as do standing snags and decaying logs, both on the ground and in streams. Seedlings, saplings, and pole-sized trees grow in the scattered openings that are created as large old trees die and fall to the forest floor. Trees of all ages occur in such stands, and the ages of dominant trees exceed 300 years. In some stands the oldest trees are more than 800 years old, 3 meters in diameter, and 60 meters in height.

Wildlife habitat management units identified on maps in the Phase I Draft SEIS (Forest Service 1988a, Figures 4-24 to 4-35) show the location of habitat important to old-growth dependent species. The maps do not display all old-growth habitat, nor do they display all wildlife

habitats that occur in the study area. Old-growth habitat was mapped in conjunction with deer winter range, around concentrations of eagle nest trees, and near the mouths of streams. These areas include most deer winter range and estuarine fringe, along with some beach fringe.

Old-growth habitat was not inventoried for the Tongass Land Management Plan, but was addressed by prescription in the 1986-90 FEIS. Wildlife management units were defined where no harvest or related activities would be applied during the 1986-90 Operating Period. The "no harvest" prescription would remain in effect unless the stated management direction was modified after further environmental analysis and public disclosure. Prescribed acreages for old-growth conditions as identified in the Phase I Draft SEIS are shown in Table 4-12 (Chapter 4) along with the proposed harvest alternatives.

Wildlife Species

In addition to identifying wildlife habitats, specific animals known as emphasis species were selected for further evaluation. A species can be termed as an emphasis species for a variety of reasons. They may be threatened or endangered animals identified on state or federal lists. They may also include species commonly hunted, fished or trapped, or nongame species of special interest. Additionally, they usually include species that may be affected by the planned management programs under consideration. The discussion and analysis of each emphasis species includes a general description and, where available, information on harvest activities and habitat capability.

The human use of wildlife emphasizes many of the prominent reasons why certain wildlife species are important. Records of human use, maintained as tools for managing populations, may also provide information on population trends that can be useful in analyzing impacts of various actions. Most of these statistics are also important in describing and evaluating subsistence issues and recreational issues.

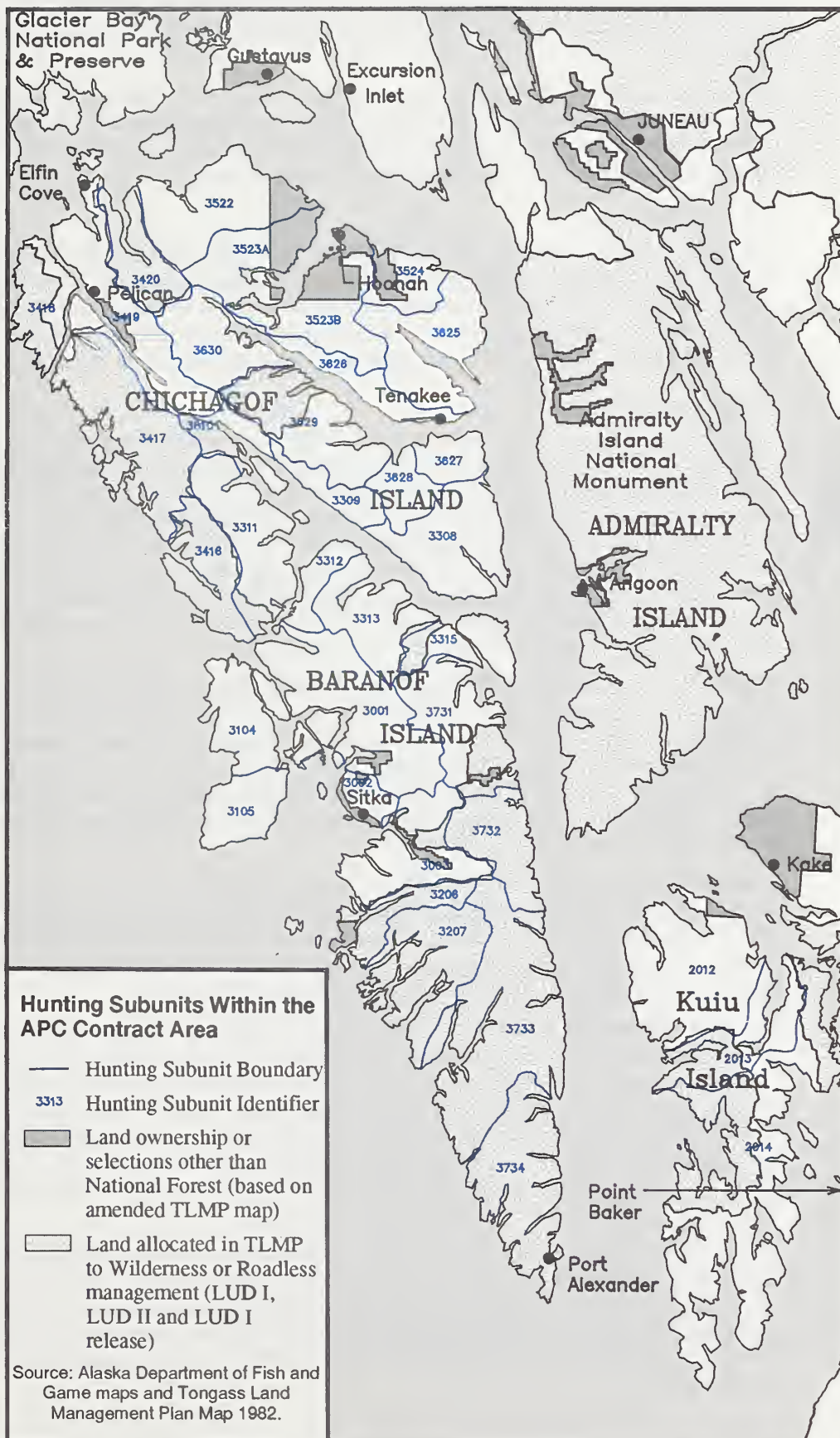
The Alaska Department of Fish and Game subdivides all land areas into Game Management Units. These boundaries provide the basis for managing the various wildlife populations under their jurisdiction. Much of the data collection concerning population density estimates originates from hunting permits and inventory work associated with the Game Management Units. Each Game Management Unit is further subdivided into Major Harvest Areas and Minor Harvest Areas.

Figure 3-2 shows that Analysis Area 6 is located in Major Harvest Areas 36 and 33. Within Major Harvest Area 36 there are two Minor Harvest Areas (3627 and 3628) that include Analysis Area 6. Within Major Harvest Area 33, there is a small portion of Minor Harvest Area 3308. Information provided below on emphasis species harvest is labeled by respective Major and Minor Harvest Areas. For additional information, the reader is referred to the Subsistence and Recreation sections of this EIS.

Information obtained from the habitat inventory and the biology of the emphasis species is worked into a habitat capability model. Habitat capability models are used to assist in the evaluation of effects of proposed land management activities on wildlife habitats and populations. The objective of each model is to estimate the capability of habitats in the study area to support populations of the selected emphasis species. Data collection on factors such as snow conditions, timber volume classes, physiographic features, predation, and clearcut size provide the values used to evaluate habitat capability. Species models were used to evaluate habitat capability for the Sitka black-tailed deer, brown bear, and pine marten (Forest Service 1988c, 1989a). The information obtained from those models is provided below under the respective emphasis species.

The development of a species model involves an extensive process of biological and literature research by a team of recognized experts. Team members are selected from a variety of sources including the Alaska Department of Fish and Game, Forest Service, US Fish and Wildlife

Figure 3-2

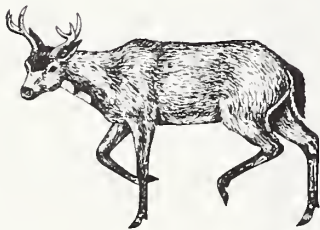


Service, and land management agencies. After a draft model is prepared, it is thoroughly reviewed by fish and wildlife agency biologists. The model review and verification process allows a consensus among the various interests and lends credibility for its use as a management tool.

It is important to note that these models are used as a tool for management decisions. They should be recognized as only one of several sources in the overall process to identify specific project effects. Knowledge concerning each species and their various habitat needs improves through time and adds to the reliability of modeling predictions.

Emphasis Species

The study of emphasis species is done to determine the effects of resource management activities on these important species and their habitats. Also, because the selected species may reflect the viability of a particular habitat, information is gained for the other animals that use the same habitat. The degree to which predicted impacts for these species can be extrapolated to a larger segment of the wildlife community depends on careful species selection.



Sitka Black-tailed Deer

Sitka Black-tailed Deer

The Sitka black-tailed deer of Southeast Alaska are more abundant on coastal islands than on the mainland (Wallmo and Schoen 1980). The Sitka black-tailed deer ranges through all major habitats in the APC Contract area. They rely heavily on forested habitats for cover, and much of their feeding is in forested areas. In summer, these deer range through all elevations, including alpine meadows and subalpine forests. They also feed in clearcuts where forage is plentiful. Winter snows drive them to lower elevations, and deep snow forces them to the beach fringe (Forest Service 1986b, p. 3-21). They may even feed on seaweed at low tide when most of their preferred browse is unavailable. They are prized for recreational and subsistence hunting in Southeast Alaska.

Black-tailed deer consume nearly 60 species of plants throughout their geographic range (Forest Service 1986a). The preferred winter forage of Sitka black-tailed deer is succulent evergreen half-shrubs and forbs, including bunchberry dogwood, five-leaved bramble, gold thread, foamflower, and pyrola (Schoen and Wallmo 1979). As snow accumulates at high elevations and covers these preferred forage species, deer will move downslope. When these preferred plants are covered with snow throughout the deer winter range, they rely primarily on various huckleberry shrubs.

Arboreal lichens are also a preferred winter food in overmature forests. The presence or absence of lichens in the diet of deer apparently reflects availability. Lichens provide large amounts of energy and may enhance the digestibility of other food items (Rochelle 1980). Lichens are a particularly important source of energy for deer during intermediate to heavy snow winters because they are available as litterfall on top of the snow.

The value of habitat for deer, under varying weather conditions, is directly related to the composition, structure, and productivity of vegetation on a site (Harestad 1985). During low snow conditions, when habitat selection by deer is not significantly influenced by snow, deer will select those habitats that provide the best foraging opportunities. Under intermediate and deep snow conditions, deer will select those habitats that provide for snow interception and food availability. The combination of a dense canopy with scattered openings in old-growth forests allows forage growth under openings while the canopy modifies snowfall sufficiently to promote forage availability and movement of deer.

ADF&G reports that deer population numbers are at a high level in Major Harvest Areas 36 and 33. These harvest areas include parts of Analysis Areas 2, 3, and all of 6. Within the Major Harvest Areas the number of deer harvested (Table 3-8) and the number of deer hunter days (Table 3-9) more than doubled between 1984 and 1987. The number of deer hunters (Table 3-10) also doubled in Major Harvest Area 36, while showing a moderate increase in Harvest Area 33.

Table 3-8

Number of Sitka Black-tailed Deer Harvested

Year	Major Harvest Area	
	33	36
1984	854	635
1985	1,128	724
1986	965	935
1987	1,987	1,285

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

Table 3-9

Number of Deer Hunter Days

Year	Major Harvest Area	
	33	36
1985	2,050	1,574
1986	2,341	2,914
1987	3,818	3,703

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

Table 3-10

Number of Deer Hunters

Year	Major Harvest Area	
	33	36
1985	616	389
1986	597	516
1987	794	634

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

Between the 1987 and 1988 hunting seasons, ADF&G redrew the boundaries for both major and minor harvest areas. Because the boundaries have changed, the hunting data for 1988 is not directly comparable to data from previous years shown in Tables 3-8, 3-9, and 3-10. In 1988, 1,691 hunters, utilizing 4,694 hunter days, harvested 2,330 Sitka black-tailed deer in Analysis Area 6.

Deer are an important subsistence and sport hunting resource used by rural and non-rural communities in the vicinity of Analysis Area 6. The 1987 Tongass Resource Use Cooperative Study found that deer made up 5 to 39 percent of the per-capita harvest of principal subsistence resources used by the rural communities in the vicinity of Analysis Area 6. To understand the importance of this subsistence resource, ADF&G conducted a survey of the 1987 deer harvest (ADF&G 1987 Hunter Survey). The survey included information on the number of deer hunters and actual deer harvest per hunter. Then each hunter was asked how many deer they needed to harvest for a season to be considered successful and how many deer they desired to harvest (Table 3-11). A successful season was based on responses to the question: What is your idea of a successful deer season? The desired deer per hunter was based on

responses to the question: What is the number of deer you would like to harvest each year? This data provides useful insight to 1) the amount of deer taken by sport and subsistence hunters, and 2) expectations of sport and subsistence hunters for future harvests. Furthermore, information on the amount of deer taken and future expectations of hunters can be related to past, present, and projected habitat capability to predict possible effects upon subsistence hunters. The subsistence section of this document discusses this issue in more detail.

A habitat capability model (Appendix C-3) was used to estimate the number of Sitka black-tailed deer that could be sustained in Analysis Area 6, based on the projected deer habitat capability (Table 3-13). Several factors were considered including the type of forested lands, elevation, snow depth, and predation. Forested lands were calculated from the timber layer of a Geographic Information System database used during revision of the Tongass Land Management Plan. These lands included clearcuts from 0 to 25 years in age, second-growth timber, noncommercial forest, and commercial forest of low volume (8 to 20 MBF/acre), mid volume (20 to 30 MBF/acre), and high volume (30+ MBF/acre). Habitat use estimates were calculated for elevations both below and above 800 feet. Snow depths were based on the number of days with greater than 12 inches on the ground and mean annual snowfall. These categories included low (0 to 20 inches), medium (20 to 80 inches), and high (80 to 160 inches).

The estimated deer numbers in Table 3-13 include information on carrying capacity at the start of the APC Contract (1961) and the present condition to 1990. The table shows that Analysis Area 6 on Chichagof Island could potentially carry approximately 4,700 deer in 1961. Estimates to 1990 indicate that same area could carry approximately 4,100 deer, which represents a 13.8 percent reduction since 1961.

Table 3-12 provides a comparison of the model-projected potential deer habitat capability, the 1988 deer harvest, and the deer population needed to support that level of harvest. To adequately compare this information, the assumption is made that habitat capability estimates reflect an approximate deer population level.

Black-tailed deer projected habitat capability is shown for the baseline year of 1961 before APC contract cutting began and the existing level following the 1988 harvest season. This information provides an indication of how timber harvest activities have affected the model projected habitat capability for black-tailed deer populations. 1988 deer harvest levels were provided by ADF&G annual hunting and trapping records. Although the 1988 harvest levels have not been published, ADF&G did provide these numbers through personal communication.

The population number needed to support 1988 harvest levels shown on Table 3-12 has been estimated using information provided by ADF&G. This information is discussed in a non-published ADF&G document produced in September 1989 entitled "Harvest Rates of Sitka Black-tailed Deer Populations in Southeast Alaska For Land-use Planning." The paper provides a rationale for the ADF&F selection of a sustainable harvest rate to use in deer habitat and population management planning. The ADF&G recommends a deer harvest rate of 10 percent should be used in land-use and population management planning in southeast Alaska. This harvest rate was therefore used in conjunction with habitat capability estimates available from models developed for use in the area. As indicated in Table 3-12, the population numbers needed to sustain current harvest levels are 10 times the 1988 deer harvest record.

Applying ADF&G recommendation to the current deer harvest level indicates that the deer population needed to support that harvest exceeds the 1989 projected habitat capability in Minor Harvest Area 3627. In this Minor Harvest Area, the population requirement is 1 1/2 times greater than the 1989 habitat capability projection. Further analysis of the information also reveals that deer harvest exceeded necessary population numbers before APC timber harvest began in 1961.

Table 3-11

Hunter Desires for Deer by Subsistence Community ¹

Community	Number of Hunters	Deer Per Hunter For Successful Season ³		
		Actual ²	Desired ⁴	
Angoon	95	5.2	4.2	6.0
Freshwater Bay	12	3.6	1.0	6.5
Haines	177	2.6	3.7	5.4
Hoonah	299	2.5	3.4	5.2
Kake	75	2.2	3.4	7.0
Juneau	2,785	1.8	2.6	4.3
Ketchikan	1,716	1.2	1.9	3.2
Petersburg	665	2.2	2.7	3.9
Sitka	2,011	2.8	3.5	5.1
Skagway	11	3.3	3.0	3.6
Tenakee Springs	37	3.3	3.6	4.7
Wrangell	463	0.7	1.9	3.7

SOURCE: ADF&G 1987 Hunter Survey

¹ Subsistence Communities include those communities whose residents use APC Sale Area for Subsistence.

² Actual number of deer harvested per hunter in 1987.

³ Number of deer per hunter desired for successful season was based on responses to the question; What is your idea of a successful deer season?

⁴ Number of deer per hunter desired for successful season was based on responses to the question; What is the number of deer you would like to harvest each year?

Table 3-12

Comparison of Projected Sitka Black-tailed Deer Habitat Capability, 1988 Harvest, and Numbers Identified to Support Harvest

Minor Harvest Area	Projected Habitat Capability		Deer Harvest 1988	Population Number Needed to Support Harvest
	Pre-APC 1961	1989		
3627 ¹	835	775	111	1,110
3628 ²	979	971	71	710
3308 ³	2,884	2,333	186	1,860

Source: Forest Service in consultation with ADF&G (SEIS Planning Record); ADF&G Annual Hunting and Trapping Reports, Juneau, Alaska; and ADF&G Harvest Rates of Deer, Unpublished, September 1989.

¹ Includes VCUs 236, 237, and 238. The following communities were identified in the 1988 harvest record as using this area: Angoon, Juneau, Tenakee Springs, Haines, and Sitka.

² Includes VCU 235. The following communities were identified in the 1988 harvest record as using this area: Juneau, Tenakee Springs, and Haines.

³ Includes VCUs 239, 240, 241, 242, 243, 244, and 245. The following communities were identified in the 1988 harvest record as using this area: Angoon, Juneau, Sitka, and Petersburg.

Table 3-13

Projected Deer Numbers Based on a Sitka Black-tailed Deer Habitat Capability Model

VCU	Pre-APC 1961	1990	Percent Change
<i>Minor Harvest Area 3627</i>			
236	355	295	16.9
237	236	236	0
238	244	244	0
Subtotal	835	723	7.2 ¹
<i>Minor Harvest Area 3628</i>			
235	979	971	0.8
<i>Minor Harvest Area 3308</i>			
239	386	318	17.6
240	184	184	0
241	182	152	16.5
242	385	333	13.5
243	626	502	19.8
244	302	208	31.1
245	819	636	22.3
Subtotal	2,884	2,333	19.1 ¹
Total	4,698	4,027	14.3 ²

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume III, C-3, and Theme Response 9 on data and models used.

¹ This value represents the present reduction in the entire minor harvest area.

² This value represents the percent reduction in the entire analysis area.



Brown Bear

Brown Bear

In North America today, the largest population of brown bears occurs in Alaska (Peek, et al. 1987) where there are an estimated 30,000 to 40,000 bears (Alaska Department of Fish and Game 1978). Brown bears are a subspecies of grizzly bears indigenous to Southeast Alaska where they occur throughout the mainland coast and on the islands north of Frederick Sound. The northern islands of Admiralty, Baranof, and Chichagof have some of the highest brown bear densities in the world (Dufresne and Williams 1932; Schoen and Beier 1986).

Although much of Southeast Alaska is still undeveloped, logging and mining occur throughout the range of the brown bear. Game Management Unit 4, which includes Admiralty, Baranof, and Chichagof islands, is one of the most important brown bear hunting regions in the state. This area ranks third behind the Alaska Peninsula and Kodiak Archipelago with an average annual harvest of 67 bears (Johnson 1980, ADF&G Annual Hunting and Trapping Reports). Tourism and outdoor recreation are growing industries in this area. Brown bears are one of the unique features of the Tongass National Forest and many visitors to Southeast Alaska are interested in an opportunity to observe this impressive animal.

The ADF&G began brown bear investigations in Southeast Alaska during 1981 with particular emphasis on habitat relationships and the influence of logging and mining activities on bear populations. Since 1981, 70 brown bears have been radio-collared on Admiralty Island and information collected from over 2,700 radio telemetry sightings (Schoen and Beier 1986). The information obtained from this research indicates annual use of habitat types by the brown bear includes: upland and beach fringe old-growth forest (33 percent), riparian old-growth forest (23percent), alpine/subalpine (21 percent), avalanche slopes (14 percent), wetlands (5 percent), and other (4 percent). Habitat use by these brown bears varied seasonally and corresponded to differences in the seasonal abundance and quality of forage items dispersed throughout a patchy environment.

The following pattern of seasonal habitat use was derived from monitoring radio-collared bears on Admiralty Island (Schoen, In Press). Brown bears begin emerging from high-elevation dens during April and emergence continues through May. After they leave the den, many bears move to low-elevation, old-growth forests, coastal sedge meadows, or other open areas where tender new herbaceous vegetation can be found. During early summer (mid-June through mid-July), most bears move up to forested slopes and alpine/subalpine meadows where they forage on newly-emergent vegetation and berries.

The brown bear concentrates on low-elevation coastal salmon streams from mid-July through early September. During this period, 60 percent of all bear relocations (radio telemetry sightings) occurred within 0.1 mile of these streams while 39 percent were in riparian old-growth habitat (Schoen and Beier, unpublished). Though most bears are associated with fish streams at this time, some bears (primarily females) remain in interior regions of the island throughout the year (Schoen, et al. 1986). By mid-September, many bears begin moving toward upper-elevation forests, avalanche slopes, and subalpine meadows.

Winter denning begins in October and November. Mean elevation and slope of 121 den sites of radio-collared bears from Admiralty and Chichagof islands were 2,100 feet and 35 degrees (Schoen, et al. 1987). Fifty-two percent of those dens occurred in old-growth forest habitat. Though cave denning was common on Admiralty Island, many dens were excavated under large-diameter old-growth trees or into the bases of large snags (Schoen, et al. 1987).

Brown bears, in general, are opportunistic omnivores and able to utilize a variety of food sources. The seasonal food habits of Admiralty Island brown bears was described by McCarthy (1988). During spring, the diet is dominated by sedges, other green vegetation, roots, and deer. Sedges and salmon are the major food items consumed during summer, although skunk cabbage, devil's club berries, and other plants, berries, and roots are also used. During fall, salmon, devil's club berries, skunk cabbage, sedge, beach lovage roots, and currants dominate the diet. The distribution of bears correspond closely to the seasonal abundance and quality of the food items listed.

In Southeast Alaska, overmature forest is used extensively throughout the year by brown bears for foraging, cover, and denning. Clearcut logging generally results in the production of an abundance of bear forage plants during early stages of forest succession (Mealy, et al. 1977, Lindzey and Meslow 1977, Zager, et al. 1983). Theoretically, these sites should provide good or adequate habitat for a generalist species like the brown bear. However, on Chichagof Island, only 2 percent of the 866 relocations of 27 radio-collared bears occurred in clearcuts with young second growth timber (Schoen and Beier 1986). It is suspected that brown bears made limited use of young second growth because other sites (e.g., alpine/subalpine habitat, wetlands, riparian old growth, avalanche slopes) provided better foraging.

Table 3-14 shows brown bear harvest within ADF&G Minor Harvest Areas 3308, 3627, and 3628. The table reflects a relatively stable harvest over the last five years, although seven bears were harvested in 1984, which was the highest take since 1980. Adjacent communities are unable to access the area by roads or the marine highway system ferry. The harvest data

Table 3-14
Number of Brown Bears Harvested

Year	Minor Harvest Area			Total
	3308	3627	3628	
1980	3	2	0	5
1981	6	0	0	6
1982	4	0	1	5
1983	4	2	0	6
1984	4	1	2	7
1985	4	1	0	5
1986	5	1	0	6
1987	5	1	0	6

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

suggest that even though road miles in Analysis Area 6 have increased over the last few years, no substantial bear harvest increase has been recorded.

A logging camp at Corner Bay is the only notable human settlement and it has only been used intermittently over the last several years. There are plans, however, to reactivate the camp for logging activities with up to 30 year-round residents. Because bears are attracted to human refuse dumps, several "defense of life or property" (DLP) kills have occurred on Chichagof Island. With the installation of an incinerator near the Corner Bay camp, potential DLP brown bear kills should be reduced.

A habitat capability model was used to estimate the number of brown bears that could be sustained in Analysis Area 6 based on the projected habitat capability (Table 3-15). Several factors were considered including the acreage of forested and non-forested lands. Forested land acres were derived from the TLMP database and included clearcuts from 0 to 25 years in age, second-growth timber, noncommercial forest, and commercial forest of low volume (8 to 20 MBF/acre), mid volume (20 to 30 MBF/acre), and high volume (30+ MBF/acre). Other factors used to calculate habitat capability included the presence of permanent communities, the method of garbage disposal in those communities (open dumps or incineration) and road density per square mile in each VCU.

The estimated brown bear numbers in Table 3-15 include information on carrying capacity at the start of the APC Contract (1961) and the present condition through 1988. The table shows that Analysis Area 6 on Chichagof Island could potentially carry approximately 210 brown bears in 1961. Estimates to 1988 indicate that same area could carry approximately 130 brown bears, which represents a 37.8 percent reduction since 1961.

Pine Marten

Pine martens are animals that use overmature forests, including beach fringe and streamside areas. The species prefers mature conifer or mixed forest stands, although there are indications that it may be adaptable to a variety of forest habitats (Soutiere 1979). Use of habitat by the marten is related to occurrence and availability of foods and to cover characteristics. Extensive overmature forests have been called the mainstay of marten populations in the Pacific states because they provide many den sites and abundant prey items (Meslow, et al. 1981).

Pine martens are native to Southeast Alaska but apparently did not occur naturally on the islands north of Frederick Sound or Prince of Wales Island. To provide jobs for unemployed

Table 3-15

Projected Estimated Brown Bear Numbers Based on a Habitat Capability Model

VCU	Pre-APC 1961	1990	Percent Change
<i>Minor Harvest Area 3627</i>			
236	14	5	64.3
237	9	7	22.2
238	11	11	0.0
Subtotal	34	23	32.4 ¹
<i>Minor Harvest Area 3628</i>			
235.	42	35	16.7
Subtotal	42	35	16.7 ¹
<i>Minor Harvest Area 3308</i>			
239	20	11	45.0
240	11	11	0.0
241	8	5	37.5
242	15	6	60.0
243	33	17	48.5
244	14	7	50.0
245	32	15	53.1
Subtotal	133	72	45.9 ¹
Total	209	130	37.8 ²

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, and the theme response on data adequacy and models.

¹ This value represents reduction in the entire minor harvest area

² This value represents the percent reduction in the entire analysis area.

Alaskans, the Bureau of Biological Survey and the Civil Works Commission began a program in 1934 to transplant various species including the pine marten (Johnson 1981). Initial releases were made on Prince of Wales and Baranof Islands.

Efforts to establish pine marten on Chichagof Island began in 1949 by transplanting two males and six females from Baranof Island. Fifteen more animals were transplanted to the Pelican area during 1951 and 1952. To protect the new introductions, no trapping season was allowed for the marten on Chichagof Island from 1948 through 1962. In addition to that specific closure, marten seasons were generally offered only on an alternate year basis from 1925 through 1962 (Johnson 1981).

Martens are active throughout the year. Their constant activities above the ground are believed to require considerable energy to raise or lower body temperature (Worthen and Kilgore 1981). As a result, they require proportionately large volumes of food during temperature extremes. They eat small mammals, birds, insects, and fruit. The red-backed vole is the staple food source throughout the year but is most important during the winter. The limited distribution of red-backed voles in Southeast Alaska may result in dependence of the marten

Pine Marten



on red squirrels. The use of birds and their eggs increases in the diet during June and July when they are most vulnerable to martens. Fruits, berries, and some insects make up a large part of the marten diet during late summer.

Snags provide martens with important den sites and sites for resting activities in both winter and summer (Spencer 1987). They utilize the tops of broken snags as resting sites in the summer and the cavities as den sites in winter and summer. Preferred snags have been reported to range from 16 to 58 inches diameter at breast height (dbh) (Cambell 1979, Simon 1980, and Spencer 1987).

Johnson (1981) summarized population densities from several sources and reported a range of 0.6 to 1.9 martens per square kilometer (1.6 to 4.9 per square mile). Martens are trapped for their furs, and would be vulnerable to habitat loss and increased access.

Typically, pine martens are harvested in the winter by trapping. Access to the trapping areas is difficult because of winter conditions and the lack of roads. The trapper will generally access a shoreline area by boat and then hike to his traplines. Table 3-16 shows pine marten harvest within ADF&G Minor Harvest Areas 3308, 3627, and 3628. The table shows a trend toward harvesting fewer pine marten, especially over the last several years. Minor Harvest Area 3308, however, did show an increased number of martens trapped in 1987-88.

A model was used to estimate the number of pine marten that could be sustained in Analysis Area 6, based on the projected habitat capability (Table 3-17). Several factors were considered including the type of forested lands and elevation. Forest land information was calculated from the timber layer of a Geographic Information System database being developed during revisions of the Tongass Land Management Plan. These lands included clearcuts from 0 to 25 years in age, second-growth timber, noncommercial forest, and commercial forest of low volume (8 to 20 MBF/acre), mid volume (20 to 30 MBF/acre), and high volume (30+ MBF/acre). Habitat use estimates were calculated for evaluations both below and above 800 feet.

The estimated pine marten numbers in Table 3-17 include information on carrying capacity at the start of the APC Contract (1961) and the present condition to 1990. The table shows that Analysis Area 6 on Chichagof Island could potentially carry approximately 450 pine martens in 1961. Estimates to 1990 indicate that same area could carry approximately 246 pine martens, which represents a 45.3 percent reduction since 1961.

Land Otter

Land otters generally occur close to the beach (Larsen 1983, Woolington 1984) in the areas recognized as beach fringe habitat. Some also occur along streams and lakes. Otters appear to be relatively intolerant of man, but they are opportunistic and will use man-made structures and log jams, as well as natural cavities and beaver lodges, for dens and resting sites.



Land Otter

Table 3-16

Number of Pine Martens Harvested

Year	Minor Harvest Area			Total
	3308	3627	3628	
1984/1985	41	81	0	122
1985/1986	21	35	52	108
1986/1987	0	0	0	0
1987/1988	63	0	0	63

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.

Table 3-17

Projected Pine Marten Numbers Based on a Habitat Capability Model

VCU	Pre-APC 1961	1990	Percent Change
<i>Minor Harvest Area 3627</i>			
236	32	15	53
237	20	20	0
238	24	24	0
Subtotal	76	59	22 ¹
<i>Minor Harvest Area 3628</i>			
235	88	88	0
<i>Minor Harvest Area 3308</i>			
239	39	19	51
240	20	20	0
241	18	5	72
242	36	10	72
243	71	20	72
244	31	7	77
245	71	18	75
Subtotal	286	99	65.4 ¹
Total	450	246	45.3 ²

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume III, C-3, and Theme Response 9 on data and models used.

¹ This value represents the present reduction in the entire minor harvest area.

² This value represents the percent reduction in the entire analysis area.

Habitat selection is also a product of food availability. Food items include fish, abalone, sea urchins, chitons, crabs, and other marine invertebrates; however, fish are generally the main food source. Otters den and rest in root systems of trees, under logs and rocks, and in other protected sites. Radiotelemetry data show extensive movements along the coastline, and otter sightings in freshwater habitats are common.

Land otters are furbearers pursued by trappers, and the populations would be affected by increased access to trappers (assuming no change in current State regulations or limits and no downward trend in pelt values).

Typically, land otters are harvested in the winter by trapping. Access to the trapping areas is difficult because of winter conditions and the lack of roads. The trapper will generally travel to a shoreline area by boat and then hike to his traplines. Table 3-18 shows land otter harvest within ADF&G Minor Harvest Areas 3308, 3627, and 3628. The table shows a trend toward harvesting fewer land otters, especially over the last several years.

Bald Eagle

The population of bald eagles is widely dispersed throughout Southeast Alaska during the breeding season. Bald eagles that breed along the coast tend to remain close to their breeding territory throughout the year if food is available. When not involved in nesting activities,

Table 3-18

Number of Land Otters Harvested

Year	Minor Harvest Area			Total
	3308	3627	3628	
1979/1980	0	0	0	0
1980/1981	4	0	4	8
1981/1982	4	0	4	8
1982/1983	4	0	4	8
1983/1984	0	0	0	0
1984/1985	1	2	3	6
1985/1986	4	0	4	8
1986/1987	1	1	2	4
1987/1988	0	0	0	0

SOURCE: ADF&G Annual Hunting and Trapping Reports, Juneau, AK.



Bald Eagle

however, these birds may temporarily move to feed at abundant sources of food. Habitats commonly used include beach fringe, some estuarine fringe, and streamside riparian. Bald eagles may also concentrate at feeding grounds in the spring. Throughout their range, bald eagles are opportunistic in their use of available food resources. Fish is the dietary mainstay in Southeast Alaska (Kalmbach, et al. 1964). This study identified fish as 65.7 percent of the year-round diet, although a variety of other foods were taken. These included birds (18.8 percent), mammals (1.2 percent), invertebrates (2.0 percent), and carrion (12.3 percent).

Foraging methods of bald eagles include scavenging, hunting live prey, and stealing food from other eagles and other species of fish-eating birds (Evans 1982). Reports along the Chilkat River indicate that bald eagles fed on spawned out salmon carcasses during fall and winter. In summer, they fed on live fish as well as carcasses.

Breeding activities in Southeast Alaska begin as early as February, and involve establishment and defense of the breeding area. Typical nesting habitat along the coastline occurs in the old-growth forests with Sitka spruce trees comprising the majority of nest sites. The selected tree generally has a top that is bushy, broken, or deformed. Such tops are more likely to provide strong support for the massive nest that is built. The nest platform is typically constructed of sticks up to 4 feet long and 2 inches in diameter. Mosses are used to line the nest, along with lesser amounts of grasses, twigs, seaweed, and other debris. The eagles tend to use the same nest year after year, making repairs as needed. They often construct alternate nests, and occasionally switch their use to them.

Perching sites are an important component of bald eagle nesting habitat. They perch on tall trees and snags to scan the water and shore for food. They also use these vantage points to protect their nests from avian predators. Tall trees having a clear view of the nest and surrounding water provide the most valuable perching sites. Other functions suggested for perch trees include: sites for consuming prey, sites for display to attract potential mates, and conspicuous posts from which territory occupation may be signaled (Stalmaster, et al. 1985).

Bald eagle populations in Southeast Alaska have increased since the establishment of the Memorandum of Understanding between the Forest Service and the US Fish and Wildlife Service in 1968 and as amended in 1984 (Forest Service 1984) and the removal of a State bounty on bald eagles in 1952. This population increase resulted primarily from the protection of the eagles themselves and their nests by providing a 330-foot buffer strip around identified nesting sites. Population estimates based on transects flown by the Fish and Wildlife Service show an increase in number from about 7,000 birds in the early 1970s to over 12,000 in 1987 (Forest Service 1988b). During the same period, the number of bald eagle nests has also

Table 3-19

Number of Eagle Nests

VCU	Inventoried Nest Trees
235	7
236	10
237	16
238	22
239	51
240	2
241	15
242	30
243	19
244	0
245	18
Total	190

SOURCE: U.S. Fish and Wildlife Service Bald Eagle Survey, Juneau, AK.

exhibited a marked increase. Bald eagles that nest within the Alaska region comprise over half of the bald eagle population of the entire 50 states and about one-third of the continental population. Table 3-19 shows the number of inventoried eagle nest trees by VCU for Analysis Area 6.

Vancouver Canada Goose

Vancouver Canada geese are unique among all subspecies of Canada geese in that they use forested habitat for nesting and brood rearing (Lebeda and Ratti 1983). Lebeda (1980) reported that Vancouver Canada geese made use of both noncommercial forest land and low-volume commercial forest land. They nest in wetlands that are found within these forest types (the presence of wetlands correlates with sparse forest cover in such areas). Feeding in wetland edges that may extend into surrounding forest occurs until the young can fly. Then ranging farther away to feed, they eventually reach lush estuarine areas from where they may begin their fall migration south.

Threatened or Endangered Species

Consultation with the US Fish and Wildlife Service and National Marine Fisheries Service during preparation of the 1986-90 FEIS identified no inventoried resident threatened or endangered species in Analysis Area 6. Habitats for two migrating endangered species exist in the area or in the waters nearby. The American peregrine falcon (*Falco peregrinus anatum*) passes through the forests during spring and fall migration flights. The humpback whale (*Megaptera novaeangliae*) inhabits nearby waters, but there is no designated critical habitat near areas of existing or planned log transfer facilities. Letters documenting the consultation process are found in Consolidated Appendix, Volume III, H.

Fisheries

The fishing industry provides a major source of income for Southeast Alaska. Fishing, especially for salmon, is also a major source of subsistence for residents in the APC Contract area. Abundant streams and lakes in the area provide spawning and rearing habitat for pink (humpy), chum (dog), coho (silver), and sockeye (red) salmon. Steelhead trout, dolly varden



Vancouver Canada Goose

3 Affected Environment

char, and cutthroat trout occur in Southeast Alaska and contribute to a viable sport fishery. The maintenance of a strong and productive fishery, therefore, is very important to the area's economy. Sustaining the production of salmon for commercial, sport, and subsistence harvest is dependent upon area specific harvest management plans and habitat protection. Timber harvest activities can have a significant effect on freshwater habitat that may result in impacts on salmon production. This section identifies the salmon production potential and aquatic habitat conditions in Analysis Area 6.

The average annual salmon production potential of streams in Analysis Area 6 exceeds 1.9 million pounds (Table 3-20). Pink salmon contributes the largest portion (73 percent) of the production potential followed in order of abundance by chum (23 percent), coho (2 percent), and sockeye (2 percent) salmon. Most of the pink salmon and chum salmon production is derived from the Kadashan River, which is recognized as the highest pink salmon producer in northern Southeast and the third best producer in all of Southeast Alaska. White Rock Creek (VCU 242) and Sitkoh Bay Head Creek (VCU) also have significant runs of pink and chum salmon. A good size run of sockeye salmon and a small run of pink salmon occurs in the Kook Creek system (VCU 239). Many of these streams also provide habitat for anadromous trout and char, but the level of production is unknown.

*Steep Pass Fish Ladder
Enable Salmon to Bypass a
Barrier on Corner Creek*



Table 3-20

Average Annual Weight of Salmon Available for Commercial Harvest in Thousands of Pounds¹

VCU	Pink	Chum	Coho	Sockeye	Total
235	772.6	344.3	9.6	— ²	1,126.5
236	42.3	26.8	4.6	— ²	73.7
237	42.0	— ²	— ²	— ²	42.0
238	22.9	— ²	3.2	— ²	26.1
239	22.0	— ²	4.0	48.0 ³	74.0
240	— ⁴	— ⁴	— ⁴	— ⁴	— ⁴
241	— ⁴	— ⁴	— ⁴	— ⁴	— ⁴
242	420.0 ³	7.0	1.4	— ²	428.4
243	121.4	85.4	9.0	— ²	215.8
244	— ⁴	— ⁴	— ⁴	— ⁴	— ⁴
245	— ⁴	— ⁴	— ⁴	— ⁴	— ⁴
Total	1,443.2	463.5	31.8	48.0	1,986.5
Percent	73	23	2	2	100

¹ Based on data from Holstine and Colltzi (1984).

² Not surveyed.

³ ADF&G memorandum from Don Ingledue to Don Cornelius dated October 7, 1988.

⁴ No data available.

A description of stream conditions in this analysis area is facilitated by use of a three-level stream classification system described in the Aquatic Habitat Management Handbook (Forest Service 1986a). Each stream is subdivided into Aquatic Habitat Management Units (AHMU), which are based on fish use and stream channel characteristics. The area defined by an AHMU includes the stream channel, areas within braided stream channels, and adjacent riparian areas containing side channels and sloughs. In the absence of any site specific information it includes an area at least 100 feet wide on either side of the stream.

Class I streams, as defined in the 1986-90 FEIS, are stream channels that are accessible to anadromous fish (i.e., pink, chum, sockeye, and coho salmon) or channels upstream of migration barriers, which have reasonable enhancement opportunities for anadromous fish, and high quality resident fish habitat. Class II streams, as defined in the 1986-90 FEIS, are stream channels that have a steep gradient (6 to 15 percent) and generally only contain resident fish populations (i.e., cutthroat trout and dolly varden char) or channels that are upstream of a migration barrier. Class II channels may contain potential anadromous fish habitat. Class III streams do not have fish populations but have potential water quality influence on downstream aquatic habitats in Class I and Class II channels. Since these streams do not contain fish, they are not included in the analysis of potential impacts of the proposed alternatives in Chapter 4.

Analysis Area 6 has 310 miles of stream habitat (Table 3-21). Class I streams, which are utilized by salmon, trout, and char, account for 63 percent (185 miles) of the available habitat. Class II streams, which have resident fish, account for 37 percent of the habitat.

Only a small proportion of the available fish habitat in Class I and Class II streams has potentially been affected by timber harvest activities in Analysis Area 6. Thirteen percent (40.0 miles) of the stream habitat had logging to the stream bank (i.e., on one or both sides and

without a buffer zone) as of 1986 (Table 3-21). Most of this logging occurred along streams in VCU's 236 (4.6 miles), 239 (5.8 miles), 243 (3.9 miles), 244 (6.0 miles), and 246 (15.7 miles). In general, most of the existing logging roads occur in the same basins as the logged areas.

The alternative maps which accompany this FEIS show the Class I and Class II streams. Stream locations and classifications are also available in the planning record maps at the Chatham Area Supervisor's office.

Watersheds

The water quality of southeast Alaskan streams is good in terms of sediment levels, temperatures, and water chemistry. A combination of steep slopes, heavy precipitation, and the limited water-holding capacity of watersheds results in fairly predictable seasonal flow characteristics.

Stream Temperature

Summer temperatures in main channel streams in the study area normally range from 37 degrees to 52 degrees Fahrenheit, but may occasionally exceed 60 degrees. The frequent cloudiness, low air temperatures, steep channel gradients, and frequent precipitation that characterize this region keep stream temperatures below the range considered harmful to fish. However, fish kills due to high temperature have been documented in southern Southeast Alaska, but the validity of those reports has been questionable. In Analysis Area 6, there have been no documented fish kills due to stream temperature. Factors that lead to these events may include extended dry and low-flow periods, high air temperatures, neap tides, and large salmon runs that become isolated in stream pools within the intertidal area. Valley and stream riparian characteristics, and the presence of lakes, may also play a part in these fish-kills. Streams with extensive lakes or muskegs along their courses are more likely to have high temperatures if forests are cut without leaving riparian vegetation to provide shade.

Table 3-21

Summary of Stream Miles by Stream Classification, and Miles and Percentage of Streams with Adjacent Harvest¹

VCU	Class I ²		Class II ²		Total Miles	Percentage Cut ³
235	33.7	(1.0)	9.4		43.1	2.3
236	19.2	(4.6)	1.4		20.6	22.3
237	6.0		0.7		6.7	0
238	13.4		0.3		13.7	0
239	18.6	(5.1)	4.9	(0.7)	23.5	24.7
240	14.5		12.0		26.5	0
241	7.5	(0.3)	5.8	(0.1)	13.3	3.0
242	4.2		9.4	(2.6)	13.6	19.1
243	38.6	(3.5)	10.5	(0.4)	49.1	7.9
244	16.5	(5.7)	16.0	(0.3)	32.5	18.0
245	23.5	(12.8)	43.5	(2.9)	67.0	23.4
Total	195.7	(33.0)	113.9	(7.0)	309.6	12.9

SOURCE: ALP 1986-90 Operating Plan EIS Resource Report, Fisheries and Hydrology, April 1983, Unpublished. USFS Region 10, Juneau, AK.

¹ Figures in parentheses represent miles of stream class cut to one or both sides as of 1986.

² Stream segments labeled as Class I have anadromous fish; Class II have resident fish.

³ This value reflects the percentage of stream habitat logged to the stream bank as of 1986.



Water Quality Monitoring Station in the Kadashan Watershed Measures Sediment Transported by a Small Tributary Stream

Winter stream temperatures range from 32 degrees to 37 degrees. Cold winter temperatures may be an important limiting factor to fish production. A two- to six-week period of sustained subfreezing weather generally occurs annually between November and February in Southeast Alaska. The combined effects of severely reduced stream runoff and low air temperature can cause freezing of stream surface and intergravel water. Low temperature problems are generally most acute under conditions of: elevations above 200 feet, low surface runoff, streams with little ground-water recharge, and little or no snow cover. Streams located in alluvial bottomlands with significant ground-water recharge are least susceptible to low temperature problems.

Sediment

Soil erodability in this region is relatively low. Natural sediment yields vary greatly throughout the year, as storms affect areas of chronic natural streambank erosion and mass failure. Steeper slopes have a greater potential to produce sediment when subject to activities such as road construction and timber harvesting. Not all debris from mass failure reaches a stream channel; some is deposited on-site, at the foot of a slope. This material contributes to the development of colluvial soils, which are part of the natural landform.

Sediment can move to a stream channel, either suspended in water or as a mass. The amount of sediment which is suspended or deposited in a channel at a given time depends on the amount of debris, the amount of streamflow, and channel characteristics. Mass failures, or landslides, often occur naturally, and can be several acres in size. Sediment can severely affect water quality in a stream, but the effect is temporary, and decreases as higher streamflows move the material downstream. Almost all of the fine material which enters a channel will eventually move through the system and be deposited in estuaries.

Streamflow

Runoff per square mile is relatively high in this area. Due to the frequency of rainfall and its distribution throughout the year, perennial streams are common. Drainage density is high, with a vast network of small channels feeding into larger streams.

Peak streamflow typically occurs with heavy precipitation in the Fall. Low flows occur in late December through April, due to freezing weather, and also occur in dry summer months. Occasional storms throughout the year can cause minor increases in streamflow.

Marine Environment

Approximately 48,000 kilometers (30,000 miles) of tidal shoreline, roughly 60 percent of the total Alaskan coast, comprises Southeast Alaska's coastline. Within this region occurs a great diversity of habitats that collectively account for the complexity of Southeast Alaska's estuarine and tidal environments.

The marine environment encompasses a wide variety of ecosystems. The intertidal and subtidal marine environments are subject to effects from log transfer and storage facilities, since those are the points of concentrated activity associated with the marine transportation of logs. The preferred sites for log transfer facilities, log storage areas, camp settlements, and anchorages are deep bays, or along straits or channels. Other marine areas are not addressed here because they are not expected to be affected by activities associated with the timber harvest being evaluated in this SEIS. Activities outside the areas of concentration are widely dispersed and any potential effects would be short-term and/or diluted below detectable thresholds. This document describes the current conditions at Corner Bay, Sitkoh Bay, False Island, and Todd LTFs as a basis for evaluating the incremental impacts associated with the alternatives for completing the 1986-90 Operating Period.

The shallow marine waters and associated mud flats and estuaries that are found in the protected coves and bays provide vital habitat for some important species, such as Dungeness crab and juvenile salmon. They are part of a complex and dynamic ecosystem that includes shrimp, flatfish, marine worms, echinoderms, sponges, sea anemones, shellfish, plankton, marine algae, and other organisms.

*The Kadashan River
Drainage is a
Barometer Watershed*



The potential impacts that are of concern at log transfer sites relate primarily to the deposition of bark. Laboratory tests show that bark deposits may be a source of toxic organic leachates that may be deleterious to salmon fry and crab larvae. The accumulated bark may also smother benthic organisms. The rate of bark accumulation varies with conditions at each facility. The design of the facility partially determines the amount of bark lost (directly associated with the speed of log entry into the water), and the configuration of the location determines the dispersion of the bark by currents and winds. Log raft storage areas accumulate bark at a much slower rate than the immediate area of the log transfer facility. Little quantified information is available that documents decomposition, flushing, recovery times, recolonization rates, or other information about the longevity of bark and its effects on the marine benthic habitat.

An effect of bark and debris accumulation is that little-neck clams and bay mussels have been shown to be eliminated when as little as 4 to 5 inches of bark accumulated (Freese and O'Clair 1984). Further, Conlan and Ellis (1979) and Karau (1975) reported molluscs and several polychaetes were excluded by bark debris greater than 2.5 centimeters in thickness, and the effects of bark may last several decades. Deposition of more than a 1-centimeter layer of wood waste has been observed to produce losses of suspension feeding benthos, with major community composition changes at 5-centimeter accumulation (Conlan and Ellis 1979). In 15-centimeter deposits, suspension feeding organisms were absent and the area was dominated by a few abundant deposit feeding organisms. It can be assumed that other plants and animals that live in and on the bottom would be similarly affected.

The Corner Bay facility has been in operation long enough that deposited bark is a feature of this site (Fish and Wildlife Service 1980, Freese 1987). A US Fish and Wildlife Service (1983) survey of Sitkoh Bay found bark deposits at the LTF site. Bark deposits have also been reported at the False Island LTF (Hughes 1989). The Todd LTF has historically handled lower volumes than the other LTFs in Analysis Area 6 and is in a more exposed location with greater wind and current action that leads to greater flushing of bark. Therefore, existing bark deposits are expected to be smaller at Todd than at other LTFs in Analysis Area 6, such as Corner Bay.

Freese (1987) indicates that once benthic deposits of bark are in place, they are very resistant to decomposition or transport away from the immediate area. Therefore, bark deposits are expected to be present even at log transfer facilities that have not been in operation recently. However, the area impacted by bark is relatively restricted, for example, at 13 LTFs evaluated in Southeast Alaska, bark deposits averaged 2.4 acres per site (Freese 1987).

Toxic substances, occurring as leachates from bark, precipitate in saltwater; therefore, leachates do not appear to be a major problem in open water or where good circulation exists (Gibbons 1982, Sedell and Duval 1985). Recently, dissolved substances, such as hydrogen sulfide and ammonia, have been shown to occur in the interstitial water of bark deposits when bark accumulates on the bottom (O'Clair and Freese 1984). These substances remain within the bark and do not go into solution. However, if Dungeness crabs burrow into the bark deposit, a decrease in reproductive fecundity, egg maturation, eating habits, and overall survival can be demonstrated. It should be noted that this type of effect has been observed in only one bark accumulation in the field (Rowan Bay log transfer facility) and that, in general, crabs were not found in bark accumulations at a number of other log transfer facility locations (O'Clair and Freese 1984). Studies have demonstrated that waste wood leachates are toxic in concentrated form to fish and shellfish, such as shrimp and salmon. However, in the natural environment, toxic concentrations should not be reached due to adequate flushing and circulation. Regulations requiring monitoring of bark and wood accumulation help minimize damage to the marine environment.

Other effects associated with existing log transfer facilities relate to oil, grease, and petroleum pollution. The source of these contaminants may be the operation and maintenance of

equipment used in log handling and transfer operations. Persistent loss of small volumes of petroleum products is a concern, as water soluble compounds have been shown to be toxic to marine larvae and eggs at concentrations of 0.1 mg/l. Daily monitoring for the presence of any visible oil sheen on the water is often a permit requirement.

Land Status

This section presents descriptions of current land ownership and uses.

Private Lands

Within Analysis Area 6, there are four parcels of private land; one at Kadashan Bay (VCU 235), one at Basket Bay (VCU 239), and two at Sitkoh Bay (VCUs 243 and 244). None of these parcels have been surveyed. However, they are all relatively small and do not contribute significantly to the total land and resource base of Analysis Area 6.

Native Selections

The southeastern portion of Area 6 (the eastern portions of VCUs 239 through 244), is within the Angoon Withdrawal and has been selected for Native selection under ANCSA. According to the U.S. Forest Service's Long Term Timber Sale Contract with Alaska Pulp Corporation, VCUs 239 through 242 are timber sale contingency areas while VCUs 243 and 245 are within the primary timber sale area. Timber harvest is initially scheduled for harvest in the primary sale area. If the agreed volume cannot be obtained from the primary sale area, harvest is then scheduled in the contingency area. On lands in the primary sale area that are selected by Native corporations, but not conveyed, the affected corporation(s) must consent before road construction or timber harvest may take place; or the Regional Forester must waive the need for consent after considering the Corporation's views. On lands within a contingency area selected by a Native corporation, yet unconveyed, a written agreement must be obtained from the affected corporation(s) to allow road construction or timber harvest, as per Section 908 of ANILCA.

The Kootznoowoo Corporation and Sealaska Corporation have selected lands in the Angoon Withdrawal area that are yet unconveyed. In addition, the Kootznoowoo Corporation has selection rights to an additional 20 acres of surface estate from within CRM, T48S, R65E, Sections 29, 30, 31, 32, and 33, near Basket Bay, as provided in Section 506 (a)(4) of ANILCA. The affected area is within VCU 239, a contingency area. Sealaska Corporation has also selected a tract of land west of Point Craven in VCU 245, a primary sale area, as a Historic Place, provided for by ANCSA 14(h)(1).

Native Allotments

Two active unconveyed Native Allotment applications are located on the western shore of Sitkoh Bay, in VCU 243. They are numbered J-11886 and AA-59061. A third application in the same area, AA-8003, has been closed without conveyance by the Bureau of Land Management. The status of AA-8003 was verified in the BLM abstract printout and with the BLM State Office in Anchorage (Alliway 1988).

Withdrawals

One area has been withdrawn for lighthouse reserves in Analysis Area 6. Two lighthouse withdrawals are located in VCU 245, one at Point Craven and one south of Lindenberg Harbor. The third lighthouse reserve is located at South Passage Point in VCU 238.

Mining Claims

Three sections in VCUS 240 and 241 collectively contain 10 unpatented mining claims; the Lori Claims. The claims are located in T49S, R65E, Sections 13, 14, and 24, CRM.

Special Use Permits

Six special use permits have been issued for the following improvements within Analysis Area 6: a cabin and weir used for research studies at Kadashan Bay, in VCU 235; two electronic sites in VCUs 238 and 245; two sawmills at the head and east shore of Sitkoh Bay in VCU 243; and a helicopter landing site at False Bay in VCU 245.

The Southeast Alaska Regional Health Corporation began using the False Island administrative camp site for a drug rehabilitation program under a special-use permit in the spring of 1989.

Rights-of-Way Acquired

The Forest Service holds the following Alaska State Department of Natural Resource easement grants for log transfer facilities:

- (1) Corner Bay (VCU 236) - ADL 100237, expires July 25, 2008. Department of the Army (DOA) permits are Tenakee Inlet 17 and 25.
- (2) Sitkoh Bay East (VCU 243) - ADL 103437, DNR Easement, expires May 2, 1990. DOA permit is Chatham Strait 63. A renewal has been requested that would extend that permit to the year 2000.
- (3) Todd, in Lindenberg Harbor (VCU 245) - ADL 103478, expires July 25, 2008. DOA permit is Peril Strait 21.
- (4) False Island (VCU 245) - ADL 104598, expires May 25, 1998. DOA permits are Peril Strait 14 and 25 and are issued to APC.
- (5) Trap Bay (VCU 237) - ADL 102825, expires January 16, 2013. DOA Permit is Tenakee Inlet 27 and states that facilities must be constructed by February 21, 1991, unless the date is extended.

There is a 100-foot easement reserved for a proposed road across the private land where Sitkoh Creek enters Sitkoh Bay (VCUs 243 and 244).

Recreation

Current Use

Recreational use of Analysis Area 6 depends almost entirely on access from saltwater. There are no regularly scheduled means of public transportation into Analysis Area 6, although air taxi service is available on a charter basis. Tenakee Springs is the nearest community serviced by the Alaska Marine Highway system. A few roads access the interior of the area, but are not linked to any inter-island transportation network, limiting vehicle-dependent recreation activities primarily to Corner Bay residents. Recreational use of the area by nonresidents is infrequent and the requirement to access by saltwater eliminates traditional roaded recreation activities. Use of ATVs by nonresidents has increased in recent years.

Popular recreation activities in the general area include picnicking, camping, hiking, photography, beach activities, and boating by either kayak, canoe, or motorboat. Recreationists also enjoy viewing and hunting wildlife, including big game, small game, and waterfowl. Fishing takes place along shorelines, streams, and lakes. Winter sports include cross-country skiing and snowmobiling.

Recreation Opportunities

The Recreation Opportunity Spectrum (ROS) classification is a method used to classify areas of the Tongass National Forest into similar recreation areas based on a combination of activities, settings, and associated user experiences. Each similar area is placed in an ROS class that ranges from the least developed “primitive” class to a more developed “rural” class. An area rated “primitive” provides for activities in the most remote and least accessible settings. Areas classed “semi-primitive” are less remote and provide easier access. The semi-primitive classification has been divided into motorized and nonmotorized. These classifications are influenced by the presence of motorized boats as well as off-road vehicles. The “roaded” classes reflect a high degree of development because of harvesting. Provided that there is access from a rural area, this classification could provide for motorized recreation.

3 Affected Environment

Recreation Opportunities in Southeast Alaska Include Sport Fishing



The ROS classification system was used to inventory recreation resources in Analysis Area 6. Table 3-22 presents the acreage of land in each ROS class by VCU. Currently, 105,137 acres of Analysis Area 6 are classified as semi-primitive nonmotorized. The roaded modified class covers about 40,590 acres. The acreage in remaining ROS classes drops significantly from the above two classes with 9,682 acres of semi-primitive motorized 8,590 acres of primitive 6,073 acres of roaded natural, and 210 acres of rural. No land in Analysis Area 6 has been classified as primitive II. Expected future trends in recreation use are described in Chapter 4, Environmental Consequences.

Table 3-22

Existing Recreation Opportunity Spectrum Classes in Acres

VCU	Primitive I	Primitive II	Semi- Primitive Non- Motorized	Semi- Primitive Motorized	Roaded Natural	Roaded Modified	Rural
235	8,470	0	21,354	560	3,257	0	0
236	0	0	5,797	176	176	4,691	90
237	0	0	3,980	805	250	1,411	0
238	0	0	5,158	0	0	4,788	0
239	0	0	10,402	700	579	5,326	0
240	0	0	9,290	210	0	0	0
241	0	0	6,150	40	0	1,510	0
242	0	0	5,437	2,453	0	3,444	0
243	0	0	17,709	638	921	8,440	40
244	0	0	6,160	740	890	4,200	0
245	120	0	13,700	3,360	0	6,780	80
Total	8,590	0	105,137	9,682	6,073	40,590	210

SOURCE: USFS ROS database, Chatham Area Supervisor's Office, Sitka, AK.



Basket Lake

Recreation Sites

In VCU 235, a private residence is located on a small parcel of private land at the head of Kadashan Bay. A road has been constructed partially up the Kadashan River drainage, and can be accessed from the Corner Bay LTF. The Kadashan Road corridor is inventoried as roaded-natural.

There is a recreational anchorage on Trap Bay in VCU 237.

Existing recreation sites in VCU 239 include a trail to Kook Lake from Basket Bay and a Forest Service cabin. The cabin is accessible on foot a short distance off of the Corner Bay road system and is occupied almost continuously by anglers during most of the summer months.

Several private recreational cabins are located at the old Chatham Cannery site on the western side of Sitkoh Bay in VCU 243. A recreation lodge is being considered for this site, which is located across Sitkoh Bay from the inactive Sitkoh Bay LTF. Use of the cabins, primarily by anglers, fluctuates seasonally.

Two Forest Service recreation cabins are located on Sitkoh Lake in VCU 244, one on the northeastern end and the other on the northwestern end of the lake. These cabins are used almost continually during the summer months by anglers. In addition, the Forest Service maintains a trail that begins at Sitkoh Bay and follows the stream up to the lake and the northeastern cabin.

No established recreation sites are located in VCUs 236, 238, 240, 241, 242, and 245. Marine access is available into VCUs 240 and 241. Public float plane access is available at the Corner Bay logging camp in VCU 236.

Visual Resources

In order to understand the visual resource inventory and management on the Forest, definitions for the following terms are useful.

The Existing Visual Condition is an assessment of the level of visual quality that presently exists. The Existing Visual Condition may range from Type I, where little or no human modification is apparent, to Type VI, where man-made changes in the landscape are in glaring contrast to the natural landscape. All of the Existing Visual Condition classes are further defined in the glossary.

Generally, 69.5 percent of the analysis area exists in a natural condition (EVC Type I), while 18.2 percent in heavily altered condition (EVC Type V and VI). The remaining 12.3 percent is in a slightly to moderately altered condition (EVC Type II - IV).

For Analysis Area 6 and each VCU, the acreage in each Existing Visual Condition class is described in Table 3-23. The Existing Visual Conditions for Analysis Area 6 reflects the implementation of Alternative J selected from the APC 1986-90 FEIS.

Visual Quality Objectives (VQOs) are visual resource management goals for National Forest System lands. They are based upon the variety in the landscape, the distance between the landscape and the people viewing it, and how much the landscape is viewed by people. The VQOs include Preservation, Retention, Partial Retention, Modification, and Maximum Modification and are defined in the glossary. VQOs provide a baseline from which to measure changes for use in managing National Forest Lands. The assigned VQOs are based upon the variety in the landscape, the distance between the landscape and the viewers, and how much the landscape is viewed. As part of the visual inventory, Sensitivity Levels were mapped, completing the VQO mapping in the Tongass National Forest. The Sensitivity Level maps were approved by Regional Forester John Sandor in 1980. See the Glossary for a full defini-

Table 3-23

Existing Visual Condition (EVC) in Acres¹

VCU	EVC Classes (Type)					
	I	II	III	IV	V	VI
235	28,258	5,383	0	0	0	0
236	6,217	0	568	0	4,145	0
237	6,446	0	0	0	0	0
238	9,946	0	0	0	0	0
239	8,948	0	720	5,403	1,936	0
240	9,390	0	0	0	0	0
241	5,597	0	1,940	0	0	0
242	5,851	167	1,047	1,000	3,269	0
243	16,942	434	0	2,366	8,006	0
244	5,979	0	0	0	324	5,164
245	14,100	0	0	1,682	0	7,950
Total	117,674	5,984	4,275	10,451	17,680	13,119

SOURCE: SEIS Planning Record.

¹ EVCs range from Type I for the most natural appearing views, to Type VI, where man-made changes are grossly obvious and do not blend with the natural scenery. See the glossary for detailed definitions of each class.

tion of Sensitivity Levels. The Sensitivity Level map provides the basis for the assigned VQOs and visual quality management on the Forest.

Together with the other resource specialists and line participation, the visual resource specialist has evaluated VCU in Analysis Area 6 and assigned VQOs to each (Table 3-24). The assigned VQOs consider other resource values, including timber and the planned management direction indicated by TLMP.

Views from Tenakee Inlet, Chatham Strait, and Peril Strait, secondary travel routes for the Alaska Marine Highway system, and many small boats are of high visual sensitivity. VCUs 235, 236, and 237 are visible from Tenakee Inlet and are thus classed as Sensitivity Level 1, the highest visual sensitivity level.

Variety Classes are also considered when assigning VQOs and in making management decisions. Variety Class A refers to “distinctive landscapes” where features of land form, vegetation patterns, water forms, and rock formations are of unusual and outstanding visual quality. Variety Class B refers to “common landscapes” where features contain variety in form, line, color, and texture, or combinations thereof, but which tend to be common throughout the character type. Variety Class C refers to “minimal” landscapes where there are little changes in form, line, color, and texture. Variety Class C landscapes are naturally monotonous and often improved by modification.

This section presents an updated summary of the visual resource inventory that was conducted for Analysis Area 6 for the APC 1986-90 FEIS. A complete description of the original visual resource inventory can be found in the Resource Report for the Visual Resource, Sitka and Hoonah Ranger Districts, Chatham Area, Tongass National Forest, APC 1986-90 Operation Period EIS, dated February 23, 1983; and in the Resource Report Addition dated January 6, 1984 (Forest Service 1983b, 1984b). The following summary of the existing visual resource has been updated to reflect actions that have taken place in Analysis Area 6 since 1984 and to include VCUs that have been added to the analysis area.

VCU 235: The foreground and middleground of this VCU are visible from Kadashan Bay and the road that enters the VCU. Eight percent of the middleground and 15 percent of the back-

Table 3-21

Assigned Visual Quality Objectives in Acres

VCU	Retention	Partial Retention	Modification	Maximum Modification
235	0	10,429	20,829	2,355
236	0	794	7,294	2,842
237	0	1,952	4,494	0
238	0	2,168	7,666	112
239	2,487	10,057	4,463	0
240	0	0	7,668	1,722
241	0	0	7,537	0
242	0	416	8,678	2,240
243	0	906	19,192	7,650
244	0	1,110	9,984	378
245	0	0	22,996	736
Total	2,487	27,832	120,801	18,035

SOURCE: SEIS Planning Record.

ground are visible from the marine travel route in Tenakee Inlet, assigned Sensitivity Level 1. Thirty-seven percent of the VCU is unseen from inventoried travel routes. Variety class ratings are A in the tidal areas, C in the more uniform creek bottom areas, and B in the more varied side slope areas. Assigned VQOs are 62 percent modification, 31 percent partial retention, and 7 percent maximum modification. The Existing Visual Condition is 84 percent Type I and 16 percent Type II.

VCU 236: Fifty-five percent of this VCU is visible in the middleground and 21 percent as background from the Alaska Marine Highway and small boat travel route in Tenakee Inlet. Much less of the VCU is visible from the level of small boats traveling routes to Corner Bay and Kadashan Bay. Three percent of the VCU is unseen from any inventoried travel routes. Tenakee Inlet is assigned Sensitivity Level 1 and the Corner Bay logging road system is assigned Sensitivity Level 2. Variety class ratings are A at the head of Corner Bay and along the ridgeline adjacent to VCU 237, B at the upper elevations surrounding the VCU, and C along the Corner Creek drainage and lower elevations. Assigned VQOs are 7 percent partial retention, 67 percent modification, and 26 percent maximum modification. The Existing Visual Condition is 57 percent Type I, 38 percent Type V, and 5 percent Type III.

VCU 237: This VCU is predominantly visible as middleground with a very small portion as foreground as seen from the Alaska Marine Highway travel route in Tenakee Inlet and the Sensitivity Level 1 hiking trail from Coffee Cove to Tenakee Springs. The remaining 3 percent is unseen from inventoried travel routes or use areas. Variety class ratings are A in the tidal area surrounding Trap Bay and in the upper elevations, C in the lower drainage and lands adjacent to saltwater, and B in the midslope areas. Assigned VQOs are 70 percent modification and 30 percent partial retention. The EVC is 100 percent Type I.

VCU 238: This VCU is visible as middleground (60 percent), background (23 percent), and foreground (1 percent) from the Alaska Marine Highway and small boat route in Chatham Strait, assigned Sensitivity Level 1. Sixteen percent of the VCU is unseen from any inventoried travel routes. Variety class ratings are A along the upper elevations, B along the mid slopes, and C on the lower elevations and along the shorelines. Assigned VQOs are 77 percent modification, 22 percent partial retention, and 1 percent maximum modification. The EVC is 100 percent Type I.

VCU 239: This VCU is visible in the middleground (52 percent), foreground (20 percent), and background (2 percent) from the Alaska Marine Highway and small boat routes in Chatham Strait and the Sensitivity Level 1 Basket Bay Trail and Forest Service recreation cabin on Kook Lake. It is also visible as foreground (3 percent) and middleground (5 percent) along the Level 2 logging road system and trail to the Kook Lake cabin. Eighteen percent is unseen from any inventoried travel routes. Variety class ratings are C in the lower elevations and on the lower slopes to the shoreline north of Basket Bay and B in the remainder of the VCU. Assigned VQOs are 15 percent retention, 59 percent partial retention, and 26 percent modification. The EVC is 53 percent Type I, 32 percent Type IV, 11 percent Type V, and 4 percent Type III.

VCU 240: The higher elevations of this VCU are visible in the middleground and background from the Alaska Marine Highway, tour ships and small boat travel routes in Chatham Strait assigned Sensitivity Level 1. Most of the lower elevations and drainages surrounding Basket Lake are unseen from these travel routes. Variety class ratings are mostly B except for some C in the lower elevations to the west of Basket Lake. The assigned VQOs are 82 percent modification and 18 percent maximum modification. The EVC is 100 percent Type I.

VCU 241: Visibility of this VCU is comparable to VCU 240, which lies to the north. VCU 241 mostly is seen as middleground and background from the Sensitivity Level 1 Alaska Marine Highway, tour ship, and small boat route in Chatham Strait. Lower elevations and drainages are obscured from views in Chatham Strait. Except for some variety class C landscapes along Chatham Strait the majority of this VCU is rated as B. The assigned VQOs are 100 percent modification. The EVC is 74 percent Type I and 26 percent Type III.

*Potential Visual Impacts are
Considered During Road
Location and Planning*



VCU 242: From the Alaska Marine Highway and small boat travel routes in Chatham Strait, assigned Sensitivity Level 1, views of VCU 242 are middleground (44 percent) and background (5 percent). About half of the VCU is visible as middleground from the small plane route through the pass between Sitkoh Bay and Chatham Strait. Six percent is not visible from any inventoried travel routes. Variety class ratings are A around the tidal flat area near White Rock, B in the upper elevations, and C in the lower elevations to the shoreline. Assigned VQOs are 77 percent modification, 20 percent maximum modification, and 4 percent partial retention. The EVC is 52 percent Type I, 29 percent Type V, 9 percent Type IV, and 1 percent Type II.

VCU 243: This VCU is visible as middleground (54 percent) and foreground (10 percent) from the Level 2 small boat route in Sitkoh Bay, small plane route in the pass between Sitkoh Bay and Sitkoh Lake, and the logging road system to Corner Bay. Foreground (1 percent), middleground (18 percent), and background (5 percent) views are also available from the Sensitivity Level 1 Forest Service recreation cabin on Sitkoh Lake and the Sitkoh Lake Trail. Variety class ratings are A in the drainage adjacent to the Sitkoh Bay tidal flat, B in the upper elevations, and C in the lower elevations and drainages. Assigned VQOs are 69 percent modification, 28 percent maximum modification, and 3 percent partial retention. The EVC is 61 percent Type I, 29 percent Type V, 9 percent Type IV, and 2 percent Type II.

VCU 244: This VCU is visible as foreground and middleground from the Sensitivity Level 1 Forest Service recreation cabin at Sitkoh Lake and the Sitkoh Lake hiking trail. Middleground views are available from the Level 2 small plane route following the pass from Peril Strait to Chatham Strait. Some recreationists also view this area from the road system that connects Sitkoh Lake with False Island. Most of the lower elevations have a variety class rating of C with the mid slopes and upper elevations rating a B. The assigned VQOs are 10 percent partial retention, 87 percent modification, and 3 percent maximum modification. The EVC is 52 percent Type I, 45 percent Type VI, and 3 percent Type V.

VCU 245: This VCU parallels Peril Strait from Sitkoh Bay, past False Island toward Broad Island. Most of the VCU is visible as middleground from the Alaska Marine Highway, tour ship, and small boat route in Peril Strait. It is also visible from the small plane route along Peril Strait and the plane route through the pass from Peril Strait to Chatham Strait. VCU 245 can also be seen from the Sensitivity Level 2 roads that connect it with Sitkoh Lake and Sitkoh Bay. The majority of this VCU is rated as variety class B. Some of the lower elevations along Peril Strait from Sitkoh Bay toward Sitkoh Lake offer minimal variety and rate a Class C. The assigned VQOs are 97 percent modification and 3 percent maximum modification. The EVC is 59 percent Type I, 33 percent Type VI, and 7 percent Type IV.



*Totem Poles Represent
Clan Lineage*

Cultural Resources

Cultural resources include the evidence of past human activity, potentially dating from the first occupation of Southeast Alaska to the recent past. Information on the prehistory of the region is limited. Some sites in the region, including the Ground Hog Bay site on the Chilkat Peninsula and the Hidden Falls site on Baranof Island, indicate that the occupation of Southeast Alaska dates to nearly 10,000 years ago.

At the time of Euroamerican contact, the Sitka and Angoon Tlingit used the Analysis Area 6 portion of Chichagof Island. Villages and sites for seasonal hunting, fishing, and collecting activities were located throughout the area. Recent historical activities in the area have included commercial fishing and canneries, fur farming, logging, limited hydroelectric power development, and some mineral exploration.

The Tongass National Forest has a diverse range of historic and prehistoric artifacts and sites, including for example: historic cabins, mines, ditches, mills, canneries, homesteads, fish camps, whaling stations, and Civilian Conservation Corps-era construction projects. Aboriginal sites include campsites, workshops, village sites, fort sites, rock shelters, fishing stations (weirs), petroglyphs and pictographs, and religious sites. Many of these properties are unique; they provide the only record of former habitation and past human activities, and they help understand past human adaptations to the rigors of the northern Northwest Coast environment.

A cultural resources overview (Moss 1983, Autrey 1984, Burgeson 1985) has been prepared to compile the recorded information relating to the past uses of the APC Contract area. Portions of the area within the study boundary have been surveyed on several occasions since 1974 by a number of investigators. Most of the field examinations were conducted in conjunction with other Forest Service activities such as the 1981-86 Long-Term Sale Operating Period study. These surveys have determined the location and nature of many of the known cultural sites within the APC Contract area.

Environmental data, particularly geologic histories, are needed to understand past land use and site preservation conditions. This information has been combined with the literature and record search for the APC Contract area to locate cultural resource sites. Table 3-25 provides information on previous cultural resources surveys, while Figure 3-3 summarizes cultural resource sites for Analysis Area 6 VCUs.

Information about known sites is contained in the Planning Record. Because of the sensitivity of cultural resource sites, these records are generally not available to the public.

Socioeconomics

The socioeconomic environment affected by the proposed action includes the communities within or adjacent to the Analysis Area, the communities with forest production facilities that use the timber, and the communities whose residents visit the Analysis Area to hunt, fish, or pursue recreation. The communities near the Analysis Area include Angoon, Hoonah, Pelican, Gustavus, and Tenakee Springs. Communities with production facilities that use timber from the APC long-term sale include Wrangell and Sitka. Hunters, anglers, and recreationists from Juneau and other nearby communities use this Analysis Area, with access by private boats or float planes.

As a group, these communities form the larger part of what the State of Alaska Department of Labor refers to as Southeast Alaska or the Southeast Region. In general, employment, personal earnings, and the well-being of the population in the individual communities follows the rise and fall of economic activity in the Southeast Region as a whole.

Regional Economy

The output of the Alaskan economy is dominated by the foreign export of fishery and forestry products, the sale of North Slope oil, and the accommodation of foreign and US visitors (Figure 3-4). Heavy dependence on global macroeconomic conditions increases the amplitude of the cyclical swings in employment relative to the rest of the United States and heightens

Table 3-25

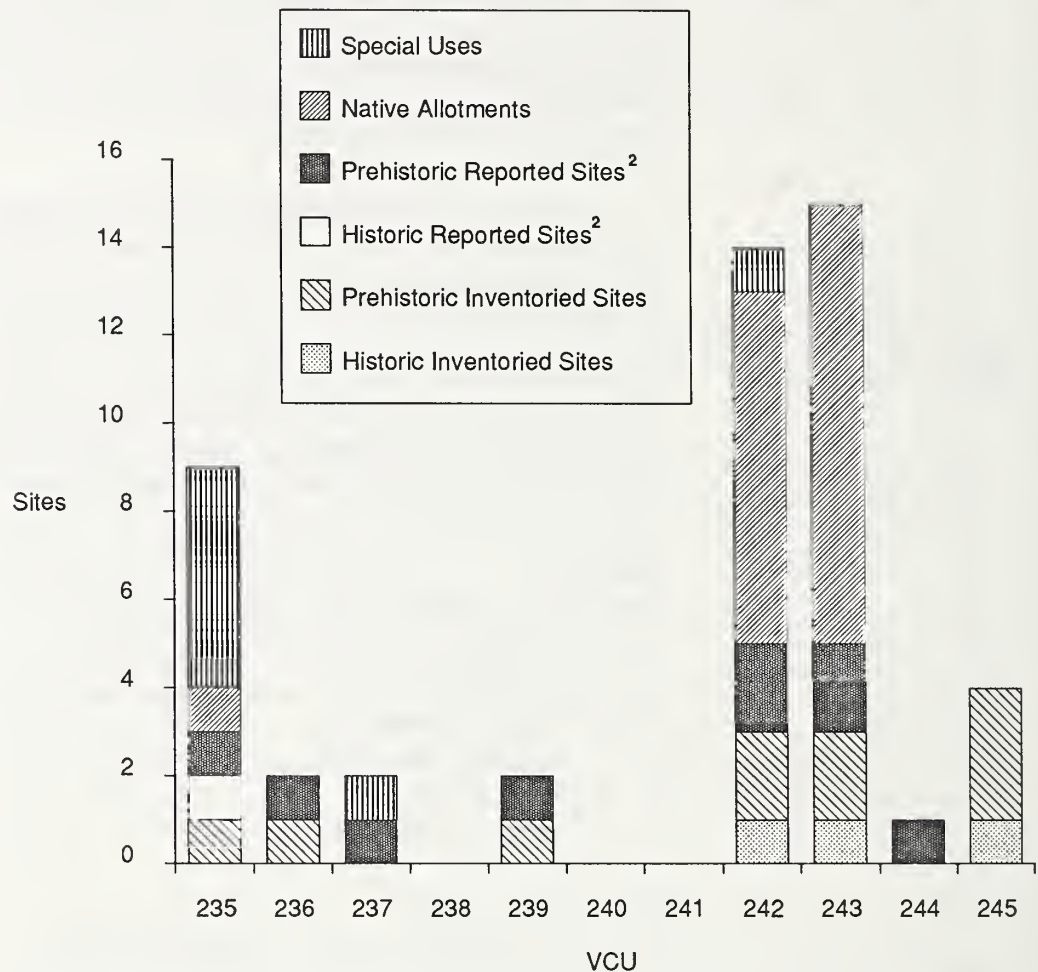
Previous Cultural Resource Surveys

VCU	Previous Surveys	Recorded Sites	Reference
235	All of Kadashan Bay shoreline; stream west of Tonalite Creek; reconnaissance level	SIT 118- Prehistoric site	Ackerman 1974 Stanford 1980
236	Most of shoreline; reconnaissance level	SIT 180- Tenake Inlet Burial; SIT 122- Corner Bay Petroglyph	Ackerman 1974 Stanford 1980
237	Most of shoreline; reconnaissance level with some complete level	None	Ackerman 1974 Fields and Davidson 1979 Bergey and Swanson 1986
238	None	None	None
239	Part of Basket Bay and Kook Lake-monitor level; selected cutting units- complete level	SIT 032- Basket Bay Village ¹	Autrey and Bjotvedt 1984 Bergey and Swanson 1986

SOURCE: SEIS Planning Record.

¹ This site has been selected by a Native Corporation under ANCSA provision 14 (h)(1).

Figure 3-3
Cultural Resource Sites



SOURCE: SEIS Planning Record.

the anxiety and concern of local residents. The private sector in Southeast Alaska is dominated by fishery and forestry exports, tourism, and accommodation of visitors including anglers and hunters.

The public sector has a significant presence in the region. State and local government employment is heavily influenced by the level of oil royalties returned to the State from Federal leases of off-shore tracts. With the capital of Alaska in Juneau, the effects of changes in employment and earnings in state and local government are pronounced.

The dollar value of total output of good and services from Alaska in 1986 was \$19.6 billion. Merchandise comprised \$1.3 billion or 6.6 percent of this output (US Department of Commerce 1988). By comparison, the total US output in 1986 was valued at \$4.2 trillion, merchandise exports were \$227 million or 5.4 percent. In value, Alaska's trade in 1986 was led by fishery products (38.4 percent), oil and gas (22.6 percent), and wood products (19.9 percent). As mentioned, the dependence on export of natural resources makes Alaska and the Southeast region vulnerable to global economic events. Figure 3-5 shows Gross State Product for the United States, the Far West (California, Nevada, Oregon, Washington, Alaska, and

Hawaii), and Alaska as defined by the US Department of Commerce, Bureau of Economic Analysis. The percent change from year to year is calculated. The reaction of the Alaskan economy to the rise in oil prices from 1978-1982 is apparent as the value of Alaska's economic output grew faster than that of the US or the Far West. In 1983, the sharply rising dollar began cutting deeply into the competitiveness of Alaskan exports of natural resources. By 1985 the precipitous fall in the price of crude oil and the rise in the value of the dollar decimated Alaskan exports, and the Gross State Product contracted.

The sensitivity of the economy to foreign markets is also seen in Figure 3-6, which shows the consistent relationship between the quantity of Alaskan exports of forest products and indicators of the strength of the Japanese economy. Japan is the principal destination for Alaska's exports of forest products. As wood-using activity increases in Japan, Alaskan exports increase. Similarly, as the relative purchasing power of the Japanese increases (yen/dollar goes down) and the cost of Alaskan products declines (yen/dollar down), the quantity of Alaska's exports increases.

The dependence of the region's economy on foreign demand is widely understood in the local communities. This economic vulnerability heightens the desire both to broaden the base of economic activity and to stabilize the existing jobs through a continuity of resource supply. Although the employment fluctuation extends over the business cycle, communities experience greater change based on their economic orientation. For example, with its base in government, Juneau experiences little annual variation. Sitka, with employment led by the pulp mill, experiences slightly more annual change. In several of the other census areas, however, communities focused on logging and fishing face more change (Figure 3-7).

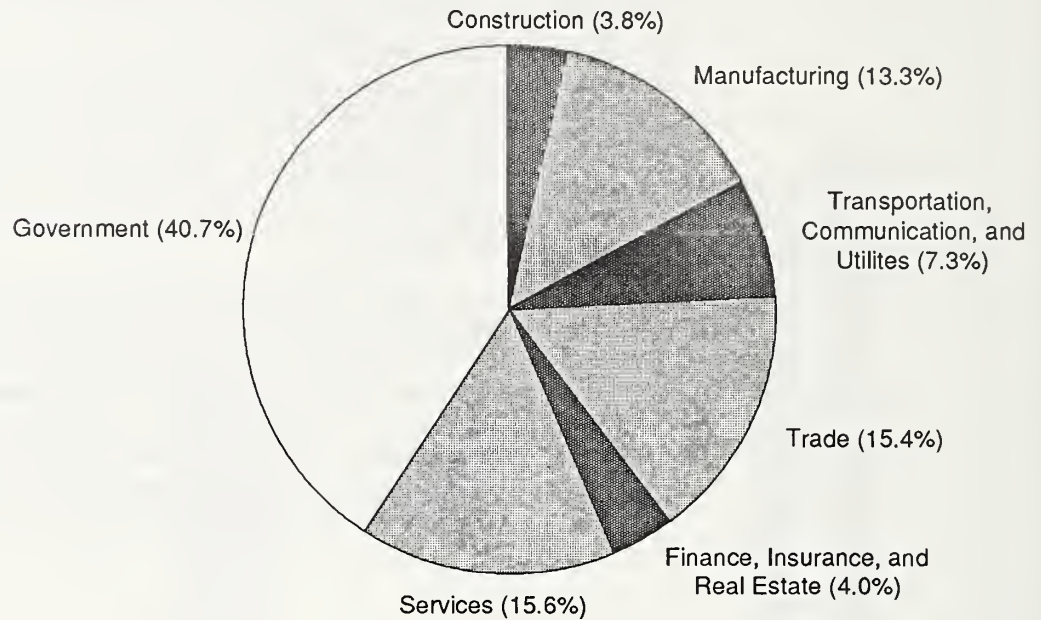
The Chatham Fish Cannery, Sitkoh Bay, Employed Angoon Residents for Many Years



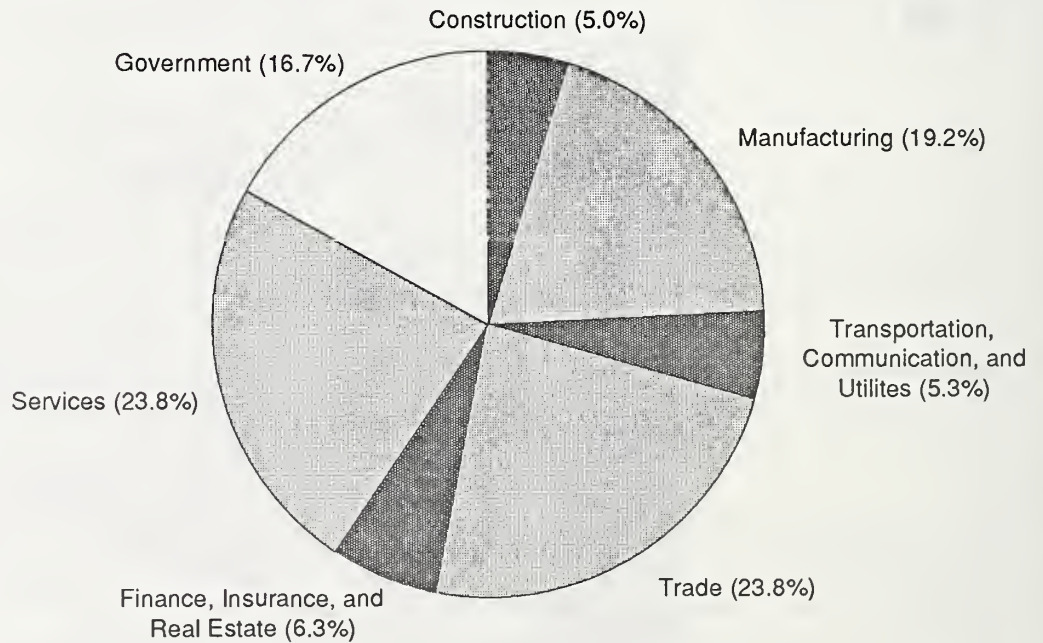
Figure 3-4

Employment in Southeast Alaska Compared to Total US Employment

Southeast Alaska

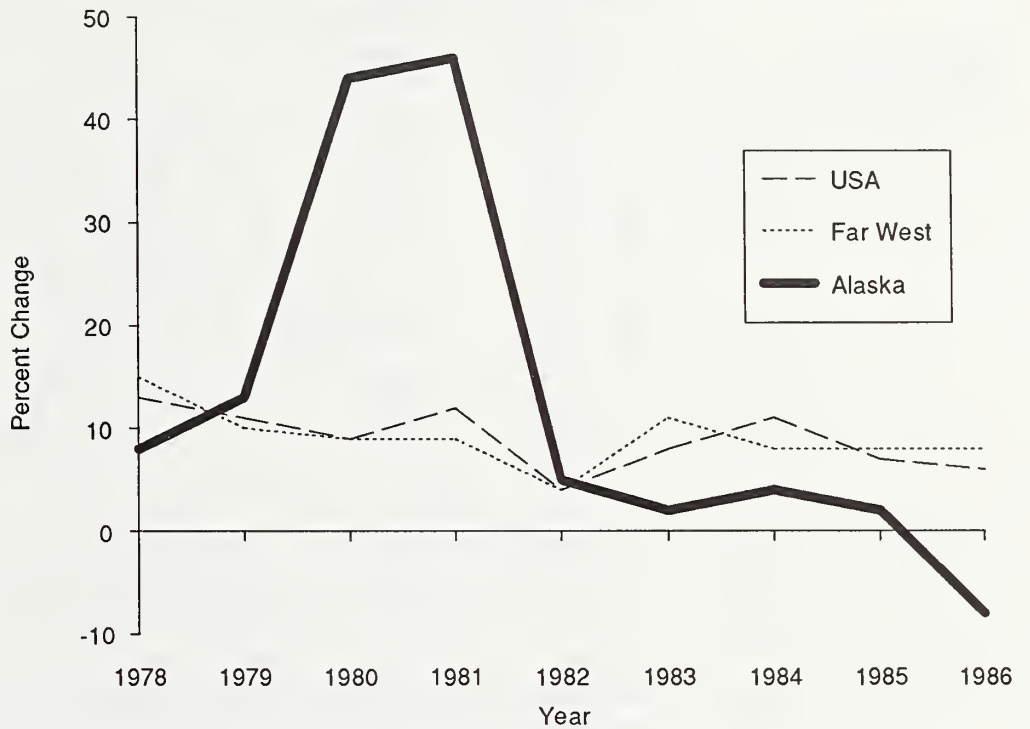


United States



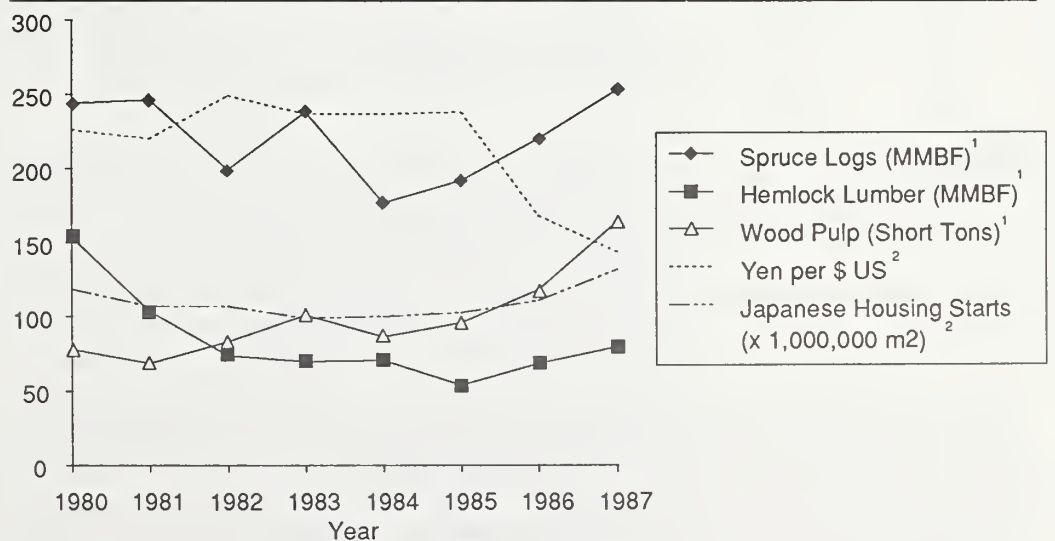
SOURCE: 1986 employment data from Alaska Department of Labor, Research Analysis Section. 1987. Statistical Quarterly, Fourth Quarter, 1986. Computations by EIS staff.

Figure 3-5
Change in Gross State Product for Alaska and USA, 1978-1986



SOURCE: Survey of Current Business, Vol. 68, No. 5, May 1988, US Department of Commerce, Bureau of Economic Analysis.

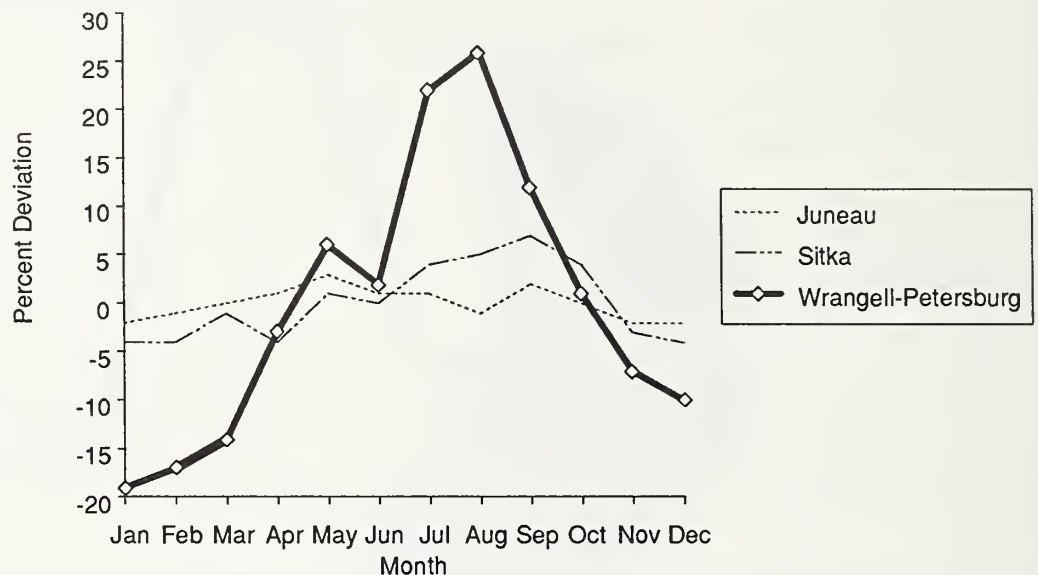
Figure 3-6
Selected Alaskan Exports of Forest Products, 1980-1987



¹ Data obtained from US Department of Commerce database, Washington, D.C..

² Data obtained from Pacific Rim Log Market Reports, published by J. Greenfield, A.C.F. and Associates, Seattle, WA.

Figure 3-7
Seasonality of Selected Southeast Alaska
Employment, 1987



SOURCE: Alaska Department of Labor, Research and Analysis Section. 1987. Statistical Quarterly, Fourth Quarter.

Population

While population in the region has increased steadily with the growth in economic activity in Alaska (Table 3-26), the Southeast Region remains sparsely populated. Juneau grew at about the same rate as the State, while Southeast Alaska grew at slightly more than half the rate of the State and its capital. Among the areas affected by the proposed action, population in the Prince of Wales-Outer Ketchikan Census Area, Angoon, Hoonah, and Kake grew principally as a result of increased timber harvest and road construction activity. Growth in Gustavus came from increased tourism to Glacier Bay National Park. Elfin Cove, Pelican, and Port Alexander grew based on expanded fishing.

Employment

With its historical basis on natural resources, Alaska's economy has experienced the mixed blessing of high wages based on labor shortage along with high levels of unemployment in rural communities (Figure 3-8). In an effort to bolster economic development by expanding infrastructure, the State of Alaska launched numerous construction projects as oil revenues swelled in the late 1970s and early 1980s. The expansive State spending fueled growth in jobs, population, and incomes in Alaska from 1980 through 1985; during those five years, the number of wage and salary jobs in the State grew 35 percent, population 30 percent, and total personal income 70 percent (Goldsmith 1987). By contrast, the US population grew 5 percent, wage and salary employment increased 8 percent, and personal income only 47 percent.

Contraction in the state's oil revenues and the high rate of exchange between the US dollar and the Japanese yen resulted in a statewide recession between 1985 and 1987. In 1987, Alaska ranked number one among the states in the percentage of unemployed who were unemployed because they lost their job: 57.1 percent of the total unemployed (ranked first in the country), 70.4 percent of male unemployed (1st), and 37.8 percent of female unemployed (12th). In 1987, Alaska ranked seventh in the percentage of the workers who were unemploy-

Table 3-26

Population Change in Southeast Region in 1980 and 1986

Location	Provisional Census July 1, 1986	Official Census April 1, 1980	Change	Average Annual Percent Growth
State of Alaska	547,600	401,851	145,749	6
Southeast Region	64,437	53,794	10,643	3
Haines Borough	1,881	1,680	201	2
Juneau Borough	26,422	19,528	6,894	6
Ketchikan Gateway Borough	12,436	11,316	1,120	2
Prince of Wales/Outer Ketchikan Census Area	5,023	3,822	1,201	5
Sitka Borough	8,102	7,803	299	1
Skagway-Yakutat-Angoon Census Area	3,784	3,478	306	2
Angoon Census Subarea	781	712	69	2
Angoon City	605	465	140	5
Tenakee Spring City	125	138	-13	-2
Balance of Subarea	51	109	-58	-9
Hoonah-Yakutat Subarea	2,078	1,817	261	2
Elfin Cove	46	28	18	11
Gustavus	211	98	113	19
Hoonah City	895	680	215	5
Pelican City	270	180	90	8
Wrangell-Petersburg Census Area	6,789	6,167	622	2
Petersburg Subarea	4,248	3,804	444	2
Kake City	665	555	110	3
Petersburg City	3,182	2,821	361	3
Port Alexander City	128	86	42	8
Wrangell Subarea	2,402	2,184	178	1

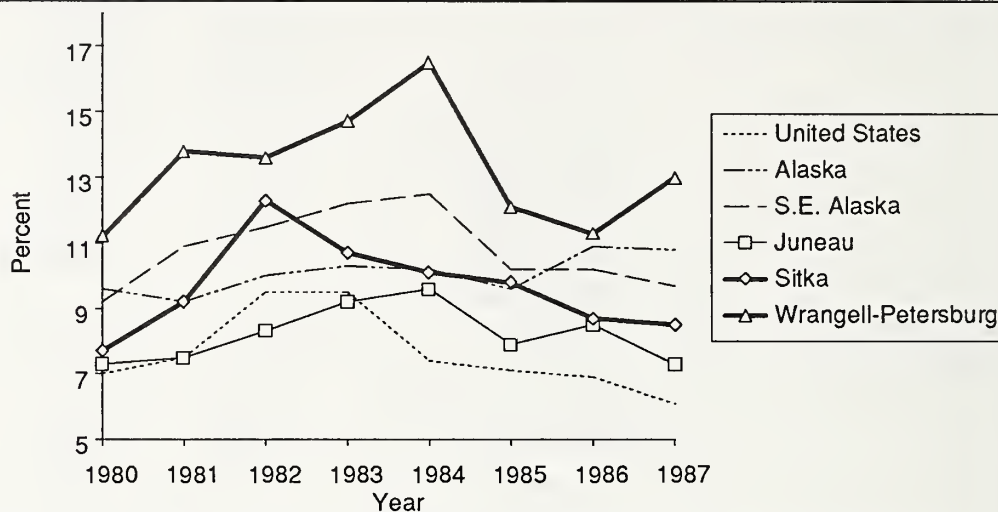
Source: Alaska Department of Labor, Research and Analysis Section, Demographic Unit, October 15, 1988.

ed for a period of 15 weeks or more (33.4 percent). Particularly hard hit were the construction, transportation, and manufacturing sectors.

Economic Uses of the Forest

The proposed action will affect three major economic uses of the forest: timber harvesting, sport and commercial harvest of salmon, and hunting for Sitka black-tailed deer by recreational and subsistence users. The significance of each activity to Southeast Alaska's economy and the dependence of each activity on land administered by the Forest Service are discussed below. Timber harvest directly impacts several economic sectors including heavy construction, lumber and paper products, and water transportation (Table 3-27). Employment in the commercial fishing sector is shown separately (Figure 3-9). The average annual value (exvessel value) of salmon produced in Analysis Area 6 has been estimated at \$816,800 (Figure 3-10). The production of pink and chum salmon contributes 96 percent of this value and coho

Figure 3-8
Unemployment Rates, 1980-1987



SOURCE: US - Economic Report to the President, February 1988, Table B-39, p.292, Government Printing Office, Washington, D.C..

Alaska - 1980-1984 data: Alaska Planning Information, Alaska Department of Labor, Research and Analysis Section, February, 1986, pp. 24-25.

1985-1987 data: Alaska Economic Trends, March 1988, p. 19, Alaska Department of Labor, Research and Analysis Section.

SE Alaska & Census Areas - 1980-1984 data: Alaska Economic Trends, April 1986, p.32.

1985-1986 data: Alaska Economic Trends, March, 1987, pp.10-11.

Gill Netting, One Method for Harvesting Pink Salmon in Southeast Alaska's Waters



production contributes 4 percent. Streams in VCU 235 are most important, contributing over 60 percent of the total value, while VCUs 242 and 243 contribute over 30 percent. Sport fishing as well as sport and subsistence hunting affect sales, earnings, and employment in the retail trade and service sectors.

Table 3-27

Southeast Alaska Employment from 1981 to 1987¹

Industry	1981	1982	1983	1984	1985	1986	1987
Nonagricultural Wage & Salary	26,995	27,705	28,483	28,661	29,190	29,035	28,600
Construction	1,404	1,514	2,017	1,814	1,665	1,098	1,100
Building Construction	395	420	548	528	497	329	
Heavy Construction	627	655	820	531	491	334	
Special Trades	382	440	649	755	677	436	
Manufacturing	3,884	2,861	3,355	3,008	3,236	3,854	4,100
Food & Kindred Products ²	1,125	1,092	908	871	996	1,160	1,100
Lumber & Paper Products ³	2,576	2,589	2,255	1,946	2,039	2,491	2,800
Other Manufacturing	183	180	192	191	201	203	200
Transportation, Comm., & Utilities	2,506	2,238	2,025	1,950	2,032	2,107	2,100
Water Transportation	542	447	486	452	470	464	
Air Transportation	760	634	492	469	469	526	
Trade	3,847	4,167	4,406	4,576	4,552	4,465	4,500
Wholesale	300	334	438	384	370	335	400
Retail	3,547	3,834	3,968	4,193	4,183	4,130	4,100
Food Stores	704	797	842	838	845	836	
Eat & Drink	1,152	1,245	1,247	1,243	1,342	1,405	
Other Retail Trade	1,691	1,792	1,879	2,112	1,996	1,889	
Finance, Insurance, & Real Estate	1,088	957	992	1,037	1,105	1,164	1,100
Mining, Services & Miscellaneous	3,409	3,850	4,297	4,521	4,488	4,520	4,600
Hotel, Motel	527	592	730	775	801	721	
Medical Services	613	674	744	775	782	862	
Other	2,269	2,584	2,823	2,971	2,905	2,932	
Government	10,857	11,119	11,390	11,754	12,113	11,826	11,000
Federal	2,345	2,216	2,163	2,087	2,085	2,084	1,900
State	5,001	5,313	5,407	5,476	5,520	5,394	5,000
Local	3,512	3,591	3,820	4,191	4,508	4,348	4,100

SOURCE: Alaska Department of Labor, Research and Analysis Section, 1988. Report of Employment and Wages, ES-202.

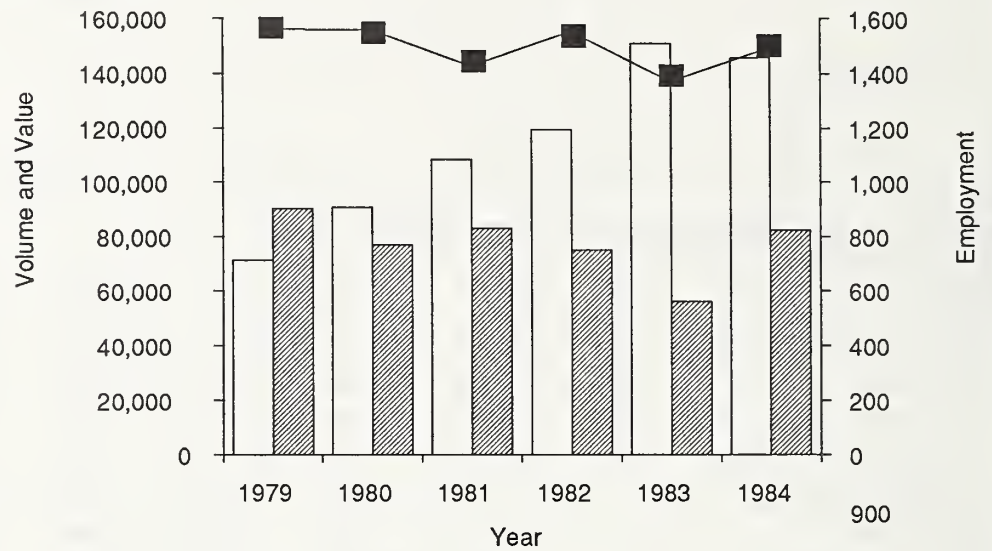
¹ For nonagricultural wage and salary employment only. These numbers represent a "job count" and do not distinguish between full and part-time employment. The employment figures do not include self employed persons, unpaid family help, domestics, most persons engaged in commercial fish harvesting and agriculture, and military employment.

² Seafood processing.

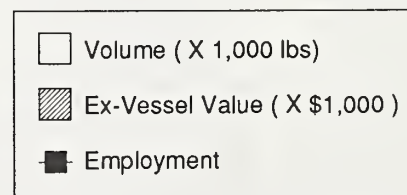
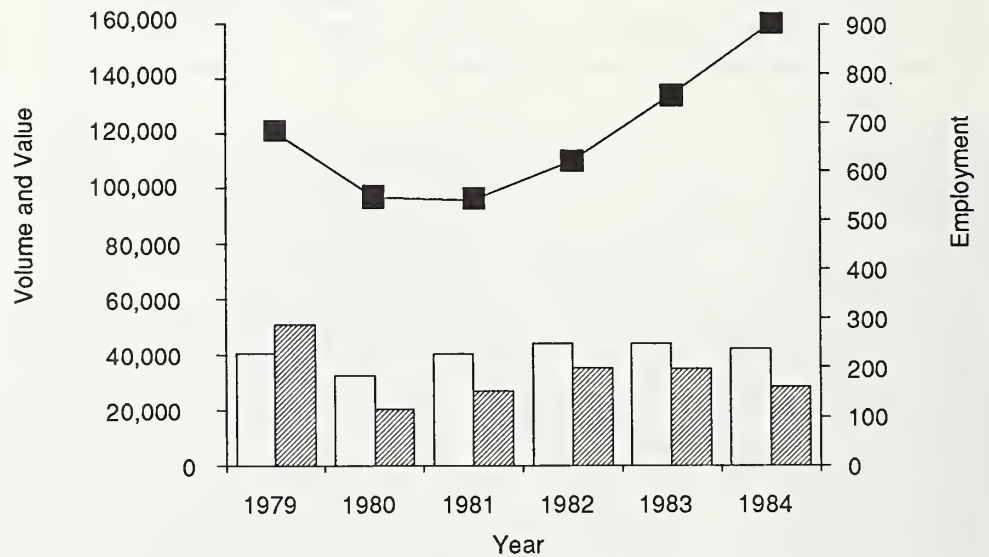
³ Includes logging, sawmill and pulpmill employment.

Figure 3-9
Fishery Employment in Southeast Alaska, 1979-1984

Salmon Fishery



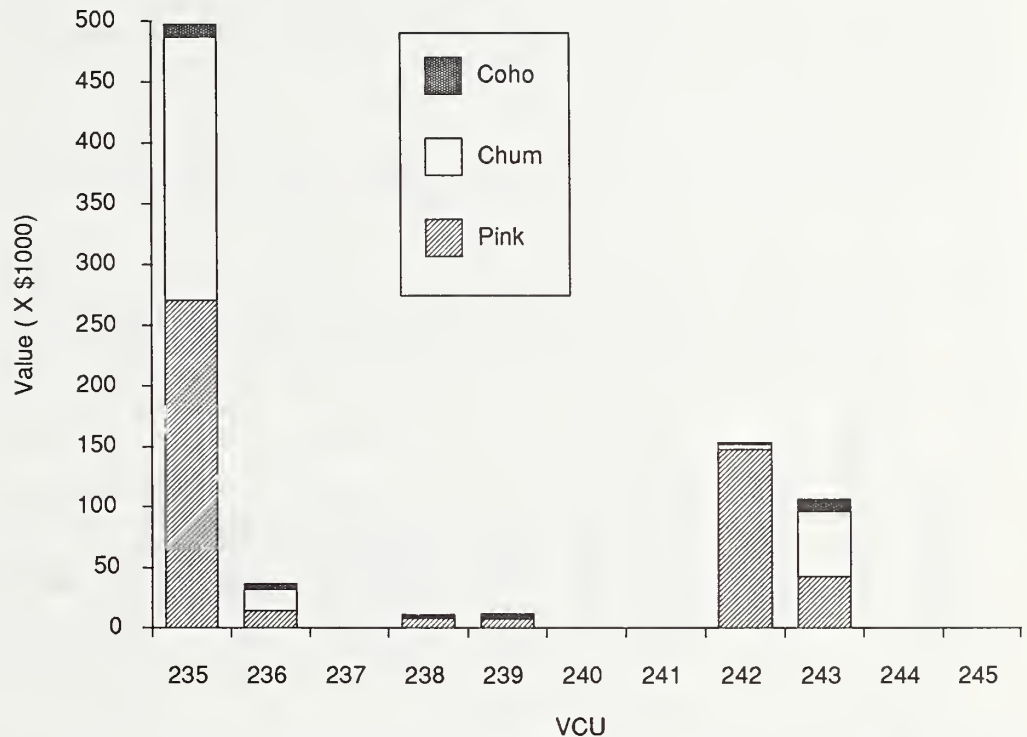
Other Fisheries



SOURCE: Thomas, K. 1987. Alaska Seafood Industry Employment 1977-1984. Alaska Department of Labor, Research and Analysis Section. pp 11-29.

Figure 3-10

Estimated Average Annual Value of Salmon Produced in Analysis Area 6



SOURCE: Based on data from Holstine and Colltzi (1984).

Timber Harvest

Figure 3-11 shows how employment depends on resource utilization and visitor accommodation in Southeast Alaska. These figures include employment supported by business expenditures in the resource industries (indirect) and the personal consumption expenditures of employees in the resource industries (induced). In total, direct employment in forest products, fishing, and visitor accommodation accounts for approximately 30 percent of the total wage and salary employment in Southeast Alaska.

From 1980 through 1988, timber harvest and forest products manufacturing supported an average of 4,481 jobs in Southeast Alaska (Figure 3-12). During this period approximately 60 percent of the timber harvested in Southeast Alaska came from land administered by the Forest Service (Figure 3-13). All softwood log exports (except cedar) originated on private or State lands as a result of federal requirements for primary processing. Given the volumes reported on harvest (Figure 3-13) and export (Figure 3-14) of softwood logs, most of the sawlog volume harvested from private land has been exported. Assuming that low-grade logs on private lands are sold as pulp logs and are harvested in about the same proportion as the utility harvest reported on the Tongass National Forest (12.4 percent), harvests from the Tongass National Forest support 60 percent of the logging employment, all of the sawmilling employment, and about 75 percent of the pulp mill employment in the region. The actual level varies from year to year based on harvest by ownership and the comparative strength of the export market. In the 1980s, forest products extraction provided 12 percent of the region's wage and salary employment with the timber from the Tongass supporting about 7 percent of the region's jobs.

Alaska Pulp Corporation (APC), situated in Sitka, is the only user of the pulp logs harvested through the proposed action. Of the pulp shipped during 1986 by APC, 75 percent went to Japan. APC also exported pulp to Korea, Taiwan, China, Mexico, and Indonesia during 1986. Total value of APC exports in 1986 was \$50 million, 20 percent of the total value of forest product exports from Alaska, and 4 percent of the total value of all Alaskan exports. APC's 1987 pulp production increased 19 percent over 1986 levels, while the value of sales increased even more to \$80.5 million. In 1987, sales went to Japan (56 percent), Korea, Taiwan, Mexico, Egypt, Russia, Greece, Thailand, Hong Kong, and domestic markets (McDowell Group, 1988).

During 1986, Alaska Pulp Corporation employed 391 workers in Sitka including 373 in pulp production and mill administration plus 18 longshoremen. The 373 mill workers accounted for 19.7 percent of Sitka's basic industry employment. When mill longshore labor is included, the pulp mill is responsible for 20.5 percent of basic industry employment in Sitka. The bonded indebtedness of Sitka and its rating are tied to the existence of the long-term contract.

Payroll statistics reveal an even greater impact in Sitka's economy. APC's 1986 millworker payroll of \$13.7 million is 27.6 percent of Sitka's basic industry payroll. Adding longshoremen payroll (an estimated \$720,000), APC accounts for 28.6 percent of Sitka's total basic industry payroll and 17.5 percent of all Sitka area payroll. The average annual salary of APC workers is nearly 50 percent higher than the Sitka area average.

From employment data it is possible to estimate population impacts. Based on the employment/population ratio, APC directly accounts for an estimated 820 Sitka residents, 10 percent of the total Sitka area population. This estimate gives equal weight to all Sitka area basic industries in determining population impacts. It is likely that the APC impact is somewhat greater, in relative and actual terms, than certain other basic industries in Sitka which may have a higher transient component or higher percentage of single men. APC's workforce has historically been a stable, year round and well paid workforce, more so than any other Sitka private basic industry.

The overall forest products industry employment impact of the APC Long-Term Sale includes pulp mill employment (373 jobs), direct logging employment (220 jobs), indirect logging employment (100 jobs), and indirect sawmill employment (150 jobs). This totaled 843 jobs in 1986, 35 percent of all forest products industry employment in Southeast Alaska. In terms of payroll, APC accounts for an estimated 35 percent, or \$30 million, of the total forest products industry payroll, estimated at \$84 million in 1986.

The sawmill employment occurs at the sawmill in Wrangell, which is owned by APC and operated as Alaska Wrangell Mill. An estimated 70 percent of Wrangell sawmill production is attributable to APC sawlog volume. The APC pulp plant is also a market for Wrangell sawmill chip production. This sawmill is the largest economic contributor to the Wrangell community, being directly or indirectly responsible for one-quarter of all employment in the Wrangell area. Several other communities, including Hoonah and Tenakee, experience employment and income benefits as a result of APC operations in the analysis area.

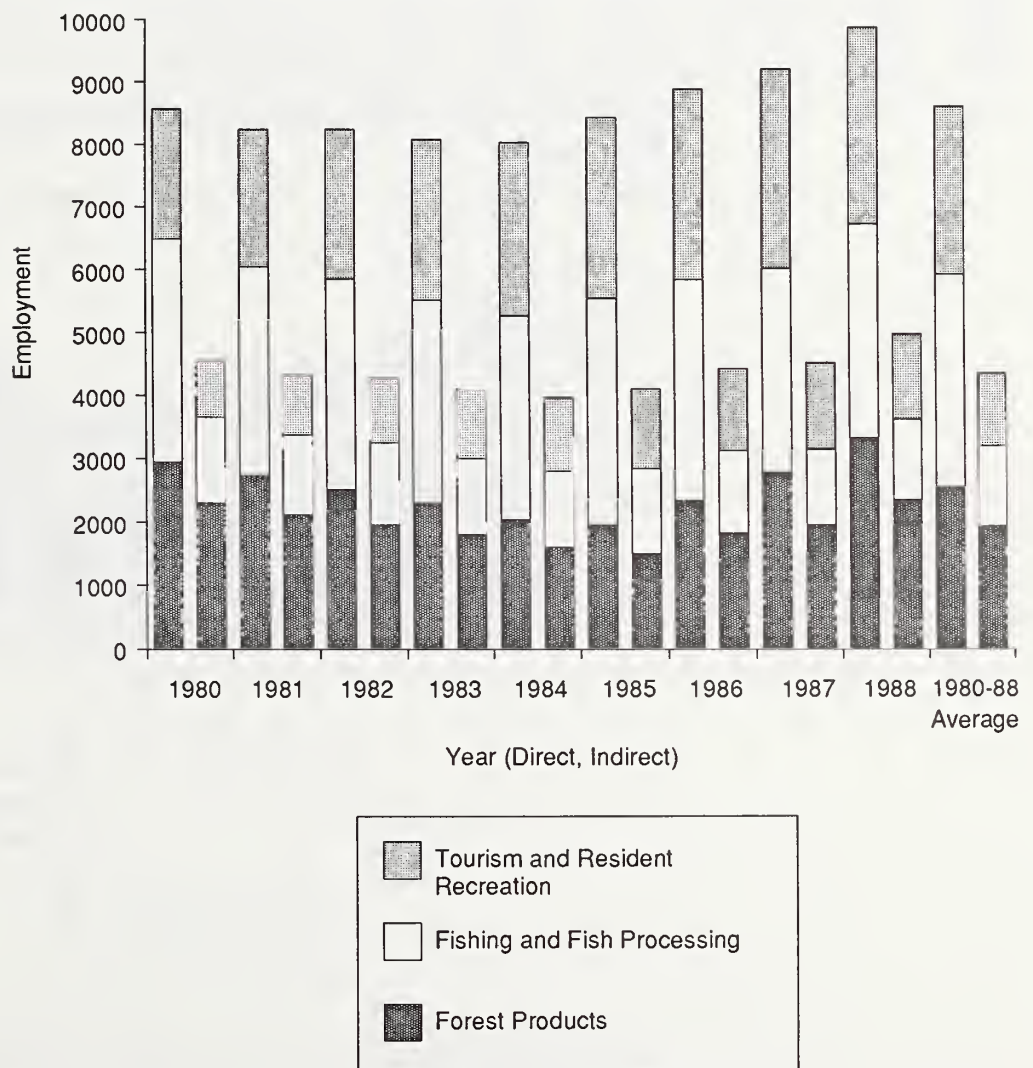
Commercial Fishing

The comparative volumes and value reported in Figure 3-9 suggest that from one-half to two-thirds of the fish used by the fish processing industry are salmon. Assuming that employment in the industry is proportional to some combination of the values and volumes of fish processed, then from one-half to two-thirds of the industry's employment is dependent on salmon. National Forest habitats produce salmon harvested in Southeast Alaska's fisheries. If habitat is proportional to ownership of timberland in Southeast Alaska then the Tongass National Forest would contribute up to 80 percent of the salmon harvest. This result assumes that hatchery-reared stock in the harvest is minor and the combined catch of hatchery stocks, wild stocks originating outside Southeast Alaska, and wild stocks reared on private or state lands total approximately 20 percent of the total harvest.

Anadromous fish rearing habitat on the National Forest lands in Southeast Alaska likely supports just under 1,850 jobs (or 55 percent of employment) in the commercial fishing/fish processing sectors. About 700 more employees in the retail, service, supply, and construction sectors depend on the business purchases and personal consumption expenditures of the fishermen and fish processors. With total wage and salary employment in the region averaging about \$28,000 between 1980 and 1987, approximately 9 percent of the region's population depends on the harvest of salmon spawned on the National Forest in Southeast Alaska. Individual communities may have a higher degree of dependence. In addition, for some families, commercial fishing and processing work provide an income supplement rather than their principal source of earnings. For other families, income from fishing or cannery work is the only cash supplement to an otherwise subsistence lifestyle. The Tongass Resource Use Co-operative Survey (Kruse and Frazier 1988) reports the results of a survey in which sampled

Figure 3-11

Direct and Indirect Employment in Forest Products, Fishing, Fish Processing, Tourism and Resident Recreation, 1980-1988

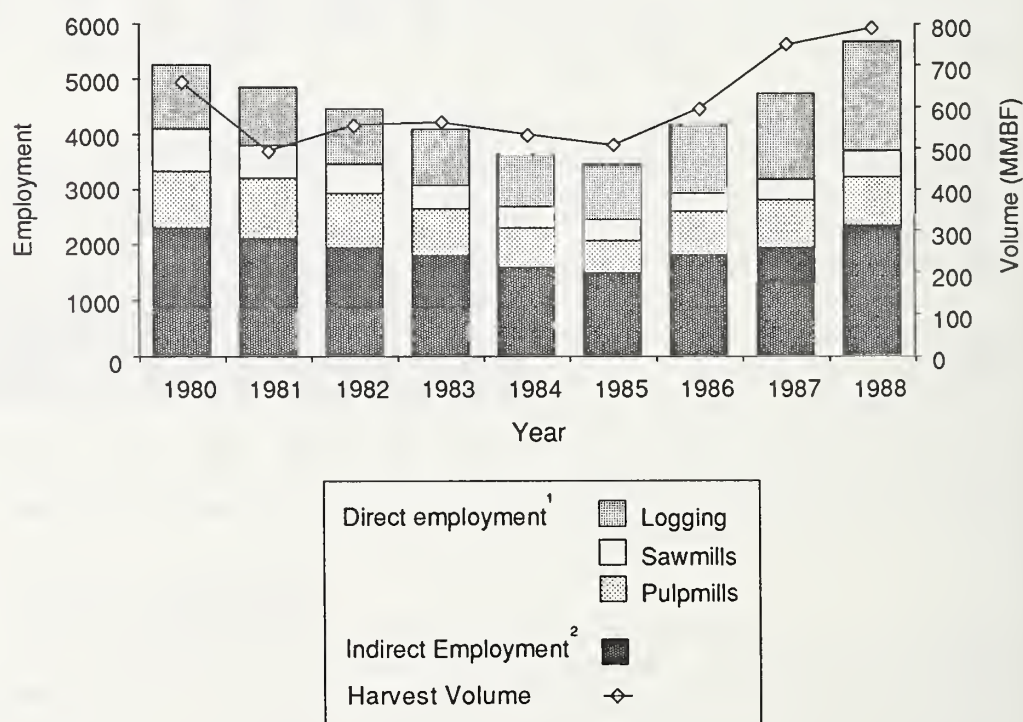


SOURCE: Status of the Tongass National Forest, 1987 Report. ANILCA 706(b), Report No. 2, USDA Forest Service, Alaska Region, MB 35, March 1988. Chapter 2, pg. 20.

households were asked to indicate economic activity by type of industry. The percentage of households by community that participate in commercial fishing and fish processing are shown in Figure 3-15.

Habitat on lands administered by the Forest Service in Analysis Area 6 produces an average commercial harvest of 997,000 pounds of pink salmon, 463,000 pounds of chum salmon, and 32,000 pounds of coho salmon. Commercial harvest by the fleet based in Southeast Alaska supports an annual average of 15 jobs spread across the harvesting, processing, and support sectors.

Figure 3-12
Lumber and Wood Products Industry Employment in Southeast Alaska, 1980-1988

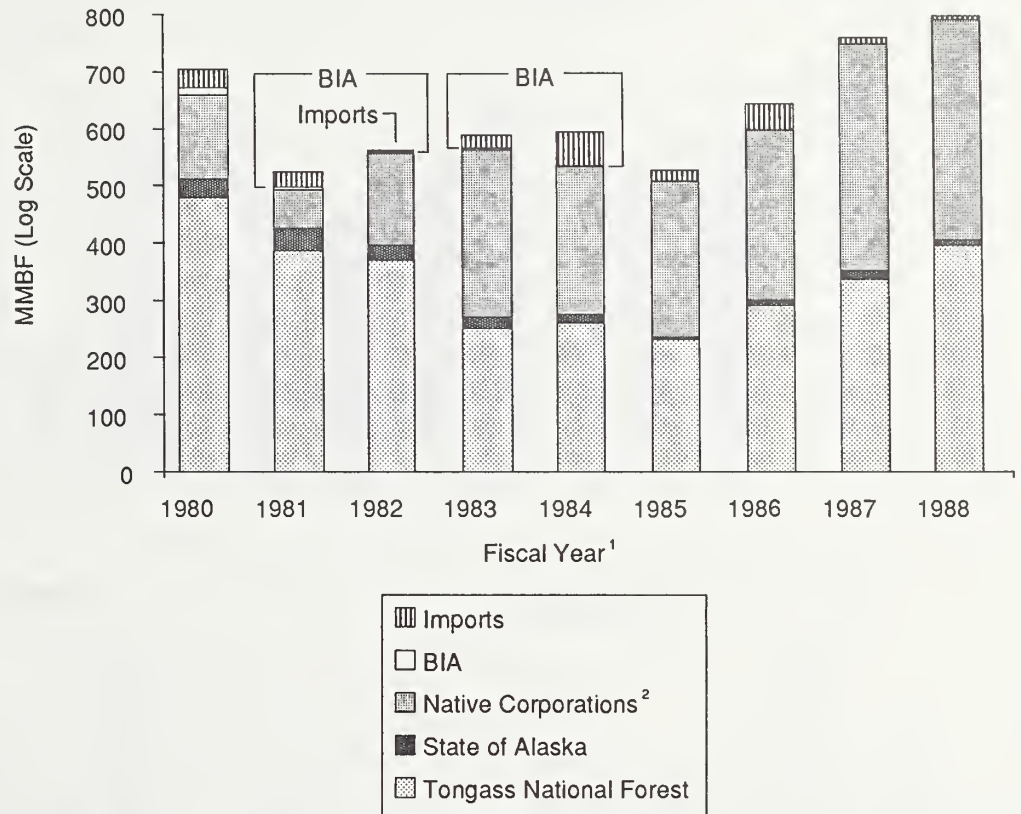


SOURCE: Timber Supply and Demand Draft 1988 Report ANILCA 706(a) Report No. 8. USDA Forest Service, Alaska Region, R10-MB-55.

¹ Alaska Department of Labor statistics subject to revision. Current as of February 9, 1989.

² Rounded to the nearest 25 jobs.

Figure 3-13
Source of Timber Processed in Southeast Alaska



SOURCE: Timber Supply and Demand Draft 1988 Report, ANILCA 706(a) Report No. 8. USDA Forest Service, Alaska Region, R10-MB-55.

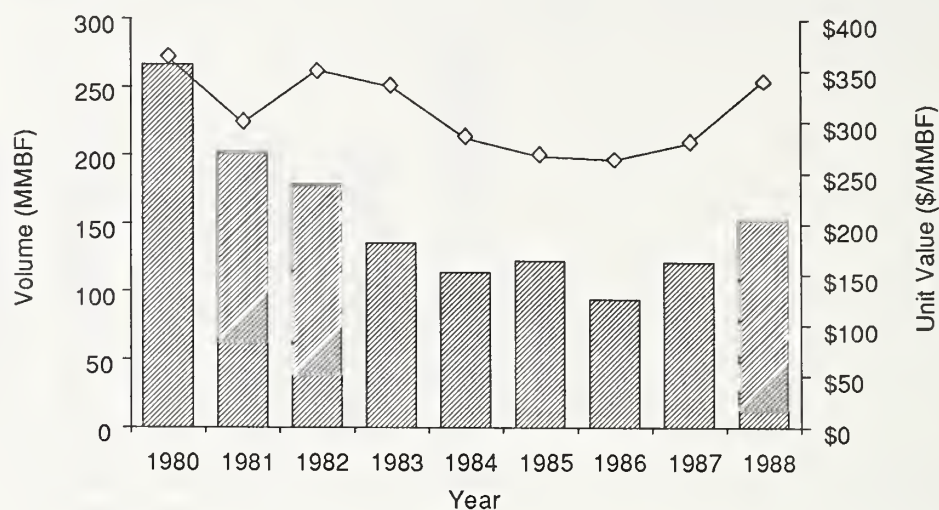
¹ The Federal Fiscal Year extends from October 1st to September 30th of the following year.

² Estimate. Sources were not found for certain years or ownerships and are not estimated (ne). Some of the private harvest reported in fiscal years 1982-86 for southeast Alaska originated from southcentral Alaska, but data were not available to separate the two regions from the estimated total.

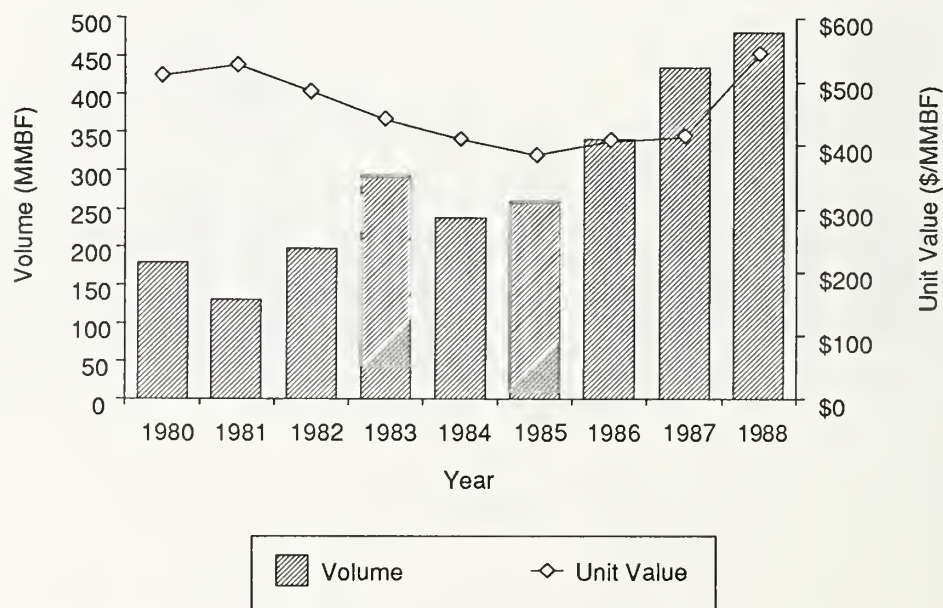
Figure 3-14a

Forest Product Exports from Alaska to All Destinations

Lumber and Cants



Softwood Log



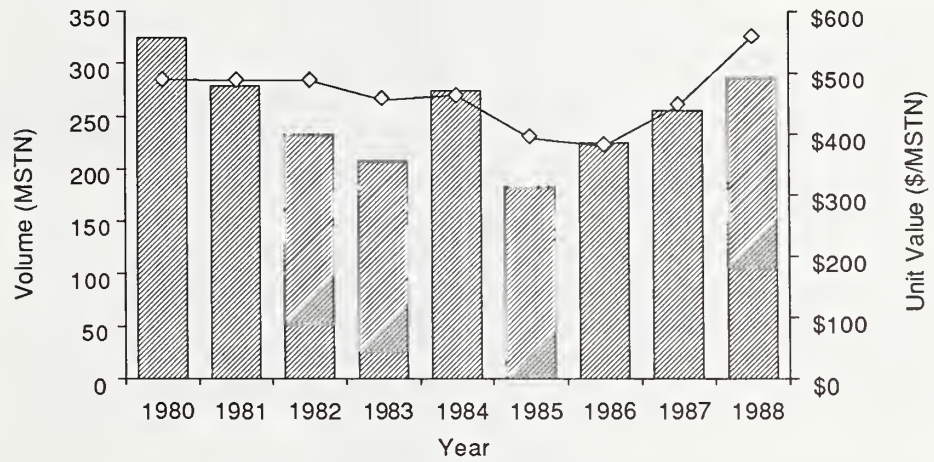
SOURCE: Timber Supply and Demand Report, 1987, ANILCA 706(a) Report No. 7. USDA Forest Service, Alaska Region, May 1988. Pg. 15.

NOTE: Volumes exported are in millions of board feet (MMBF) or thousands of short tons (MSTN). Values are free alongship (FAS) in thousands of nominal dollars. Unit values are dollars per unit.

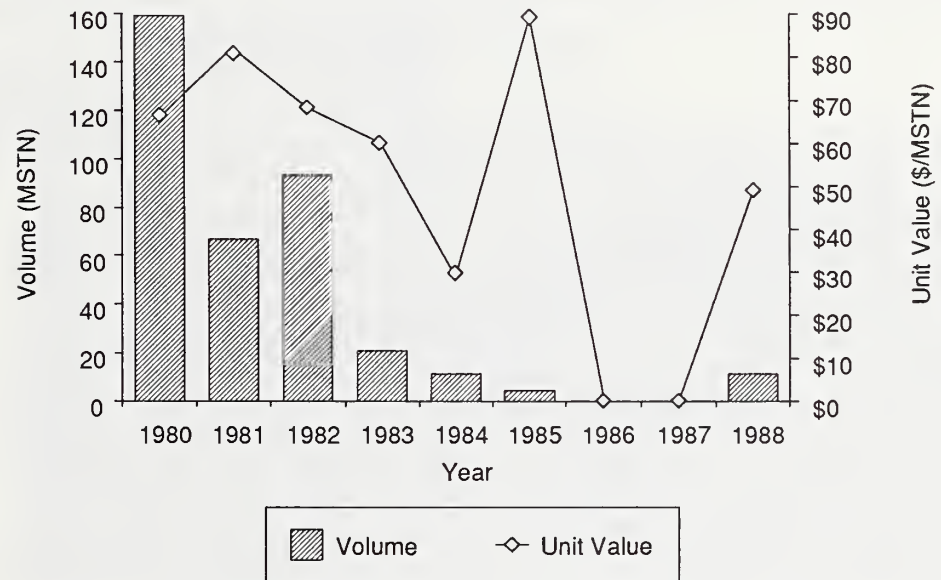
Figure 3-14b

Forest Product Exports from Alaska to All Destinations

Woodpulp



Woodchips

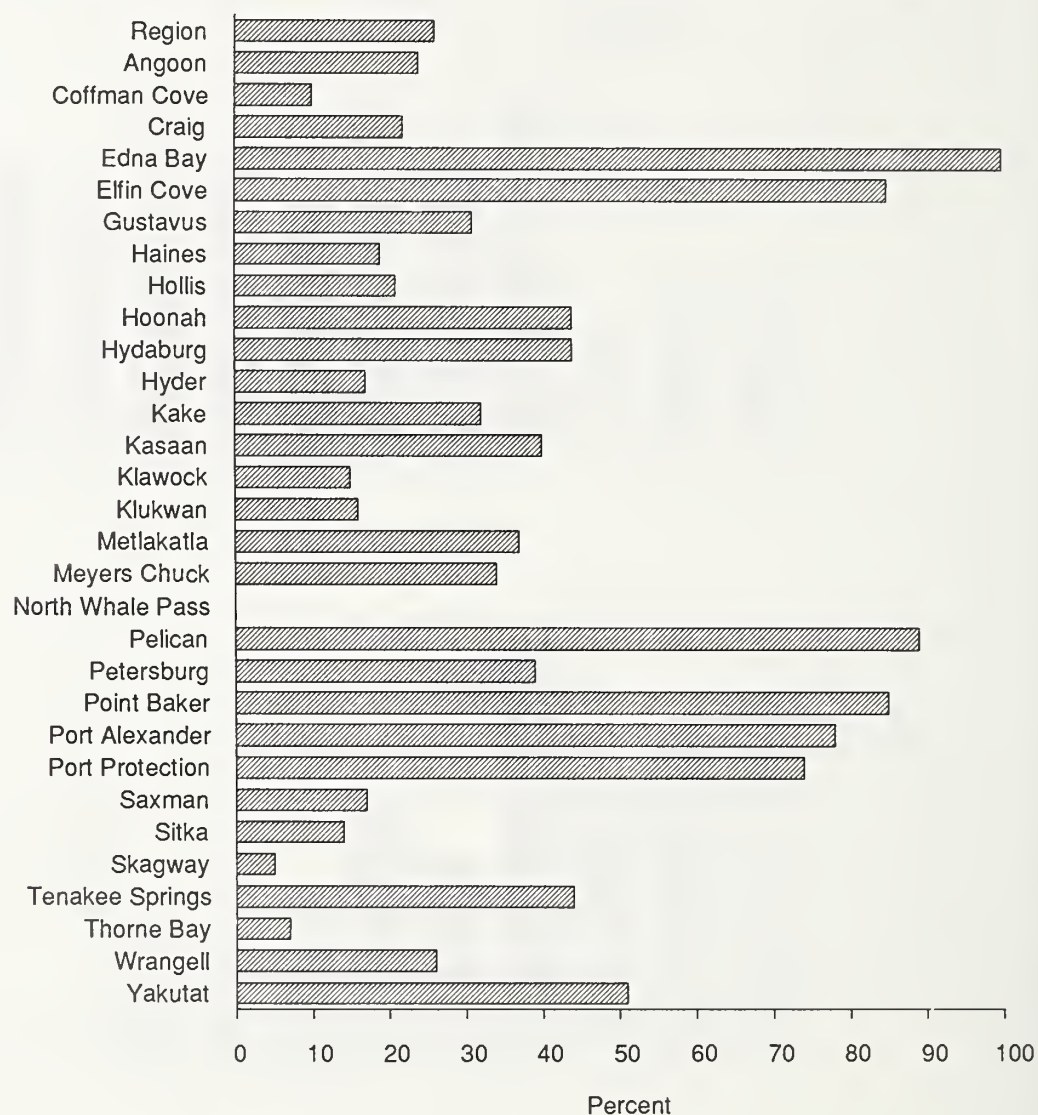


SOURCE: Timber Supply and Demand Report, 1987, ANILCA 706(a) Report No. 7. USDA Forest Service, Alaska Region, May 1988. Pg. 15.

NOTE: Volumes exported are in millions of board feet (MMBF) or thousands of short tons (MSTN). Values are free alongship (FAS) in thousands of nominal dollars. Unit values are dollars per unit.

Figure 3-15

Household Participation in Commercial Fishing and Fish Processing by Community¹



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage.

NOTE: While some families live exclusively on earnings from commercial fishing, participation in commercial fishery does not exclude other forms of employment or sources of income. This results from the fact that some families have several people in the labor force and some workers hold two or more jobs often in different sectors.

¹ The percent of sampled families indicating they were active in a commercial fishery in 1987.

Tourism and Recreation

Visitor accommodation and recreational expenditures by tourists and recreationists of Southeast Alaska supported about 2,700 jobs during the 1980s. The purchases made by Southeast Alaska businesses and the personal consumption of their employees supported another 1,160 employees. Together, tourism and recreational expenditures maintained approximately 14 percent of wage and salary employment in the region.

Six outfitter or guide service permit holders who use Analysis Area 6 were briefly interviewed to determine what areas within Analysis Area 6 they use, and how much they use them. Outfitters provide bear and deer hunting, photographing, stream and ocean fishing, hiking, dispersed camping, scenic viewing, study of flora and fauna, and forest experience. The main areas they use are the southern shore of Tenakee Inlet, the Kadashan Bay area, Corner Bay, Trap Bay, Basket Bay, Sitkoh Bay, and the northern shore of Peril Straits. The average number of people being taken into these areas is about 220 per year, with the average trip lasting seven to ten days. The permit holders average six or seven trips per season.

An estimated 285 jobs in Southeast Alaska depend on the expenditures made by hunters. About 820 jobs in the region result from the purchases of sport anglers. Another 475 jobs result from the purchases made by businesses and their employees. In total, hunting and fishing related expenditures produce approximately 6 percent of the region's wage and salary employment.

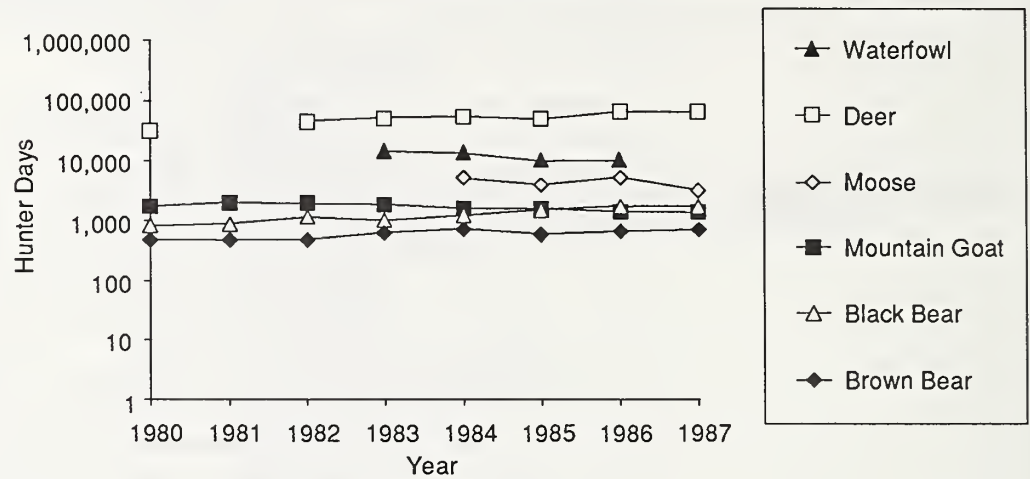
Hunter effort in the analysis area forms the basis for some of the expenditures that support jobs and personal earnings in Southeast Alaska. Figure 3-16 presents hunter-days for the region while Table 3-28 summarizes information on deer hunting, and Figure 3-17 on fishing. In 1987, the 1,116 hunter-days for deer recorded in Analysis Area 6 supported 4.4 jobs spread over the retail trade, services, and transportation sectors.

*Alaska Marine Highway
Ferries are the Primary
Method of Transportation in
Southeast Alaska*



Figure 3-16

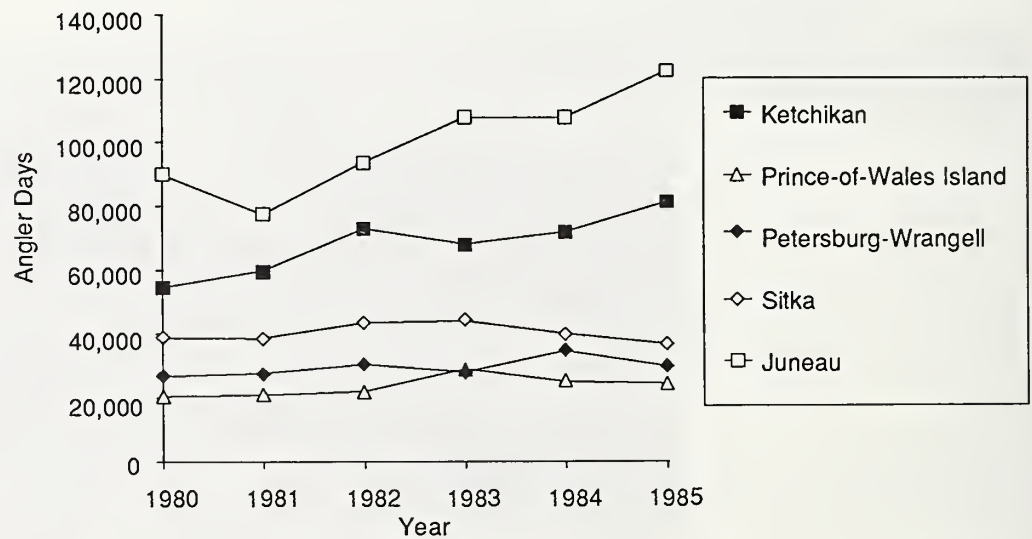
Number of Hunter Days in Southeast Region



SOURCE: Fay, G. and M. Thomas. 1986. Deer Hunter Economic Expenditures and Use Survey, Southeast Alaska. ADF&G Habitat Technical Report 86-10. 1987 data from personal communication with ADF&G.

Figure 3-17

Angler Days in Southeast Alaska, 1980 - 1985



SOURCE: Mills, M. J., Statewide Harvest Study, Vol. 27, Federal Aid in Fish Restoration and Anadromous Fish Studies, Alaska Department of Fish & Game, Table 7, page 15.

Table 3-28

Deer Hunting by Community in 1985

Community	Active Hunters (percent)	Hunter Days	Hunting Expenditures (dollars)
Angoon	21	521	44,991
Craig	28	1,504	172,340
Elfin Cove	90	194	22,847
Gustavus	6	128	1,624
Haines	6	1,963	39,821
Hoonah	33	1,229	114,925
Hydaburg	15	147	26,359
Juneau	11	13,906	1,634,555
Kake	22	407	40,293
Ketchikan	13	12,476	803,816
Klawock	33	1,443	57,091
Metlakatla	4	160	8,970
Meyers Chuck	23	100	3,781
Pelican	29	293	30,049
Petersburg	14	2,633	192,748
Point Baker	18	73	4,361
Port Alexander	12	64	2,290
Skagway	1	16	96
Sitka	22	8,834	945,915
Tenakee Springs	28	358	9,891
Wrangell	18	1,905	154,438
Yakutat	2	56	1,248
Other Prince of Wales	27	1,394	60,662
Other Alaska	— ¹	422	77,011
Outside Alaska	— ¹	352	98,886
Total for Southeast Region	14 ²	50,578	4,549,008

SOURCE: Fay, G. and M. Thomas. 1986. Deer Hunter Economic Expenditures and Use Survey, Southeast Alaska. ADF&G Habitat Technical Report 86-10.

¹ Information not available.

² Percentage value is the average for the communities.

Subsistence

The Forest Service's 1981-86 Record of Decision preceded the passage of the Alaska National Interest Lands Conservation Act (ANILCA). The Federal District Court, in *Tenakee Springs v. Courtright*, did not decide if the Forest Service complied with Section 810 of ANILCA. To ensure that the 1981-86 and 1986-90 Records of Decision comply with ANILCA, the Forest Service has provided discussions of subsistence in Phase I and II of the EIS Supplement.

Many Southeast Alaska communities depend on natural resources found in the APC Contract area for their livelihood. Activities such as fishing, hunting, tourism, timber harvest, and mining all depend on natural resources. With the passage of the Alaska National Interest Lands

Conservation Act, Congress also recognized the importance of subsistence resources to the rural communities of Alaska. ANILCA defines subsistence as:

The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal and family consumption; and for customary trade (ANILCA, 16 USC 3113).

The sharing of subsistence products among community members is an important aspect of traditional subsistence use. Table 3-29 shows the pounds of subsistence resources harvested per capita as well as the number of different types of resources harvested. It also shows the number of different types of resources that are shared (received by a household). Low income households or households whose members are unable to participate in the harvest of subsistence resources may depend on receiving products from other members of the community. Therefore, the importance of subsistence to a community can be shown, not only in the amount harvested, but also in the amount of sharing that occurs among community members.

Mean income is another indicator of the importance of subsistence to a community. A household with a higher income would be able to supply more of its needs through the cash economy. However, it should be noted that a higher income does not always indicate a lesser dependence on subsistence resources. For example, people who earn high incomes may give the resources they harvest to others who are unable to harvest their own.

Even if a household can purchase all of its food needs through the cash economy, the act of gathering subsistence resources is an important cultural aspect in Southeast Alaska communi-

Table 3-29

Role of Subsistence in Community Lifestyles

	Pounds Harvested Per Capita ¹	Resource Types Harvested ²	Resource Types Received ²	1987 Per Capita Income
Angoon	242	7.9	6.4	\$5,364
Elfin Cove	264	10.0	6.8	\$8,195
Gustavus	256	8.5	4.2	\$12,781
Haines	105	4.3	4.1	\$12,467
Hoonah	404	9.1	7.7	\$9,353
Kake	160	6.5	7.0	\$9,057
Klukwan	239	5.9	6.1	\$5,853
Pelican	355	10.0	9.0	\$11,317
Petersburg	203	7.4	5.1	\$12,602
Point Baker	345	9.4	5.3	\$6,212
Port Alexander	306	9.7	5.4	\$6,343
Port Protection	311	10.2	7.7	\$5,912
Sitka	139	5.7	0	\$14,572
Tenakee Springs	343	7.5	5.5	\$9,080
Wrangell	164	5.6	6.3	\$11,989
Southeast Alaska	176	6.2	3.7	\$11,921

SOURCE: Kruse, J. and R. Frazier, 1988. Community Reports, Tongass Resource Use Cooperative Study. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

¹ Mean value is estimated from a sample of households in each community. Actual amounts harvested may be somewhat higher or lower.

² Average number of different resource types harvested or received by households surveyed.

ties. For example, traditional foods may not be available through any means other than subsistence gathering. The occasions for gathering wild foods are often also social events. Historical patterns of movement, such as the annual cycle of dispersal into small family groups at summer fishing camps to larger gatherings at protected winter villages are also linked to the tradition of subsistence harvest.

The communities that use Analysis Area 6 for subsistence are Tenakee Springs, Angoon, Sitka, Hoonah, Petersburg, Kake, and Haines. Information on the history, population, economy, and subsistence uses for these communities is provided in the next section. The location of subsistence uses by VCU by community follows in the “Use of Analysis Area VCUs” section. In addition to these communities, there are a few logging camps whose residents use Analysis Area 6 for harvest of subsistence resources. Residents of logging camps at Corner Bay and False Island may also qualify as subsistence users under current State of Alaska, Department of Fish and Game regulations.

Angoon

Tlingit history holds that three Deisheetaan hunters discovered the site of Angoon. Already living in the area, the Gaanax’adi people left when trouble developed between the two groups. Historically, several Tlingit clans have occupied the area around Angoon (Figure 3-18). Angoon is so old that no exact date has been established for the beginning of its occupation. The first documented contact with European explorers came in 1794 when Vancouver saw people trading furs at Angoon, suggesting that fur trapping and trading with the Russians from Sitka had been important to the Angoon Tlingit for some time (George and Bosworth 1987).

Smallpox epidemics of the early 1800s decimated many Tlingit villages, and some survivors settled in the village of Angoon, increasing its population. In 1880, the Northwest Trading Company established a whaling station and trading post on nearby Killisnoo Island that employed some Angoon residents. After a few years, the whaling station was converted to a herring processing plant and ceased operations in the late 1800s. Angoon residents have been employed at various salmon canneries along Chatham Strait, including Sitkoh Bay, and other locations (George and Bosworth 1988).

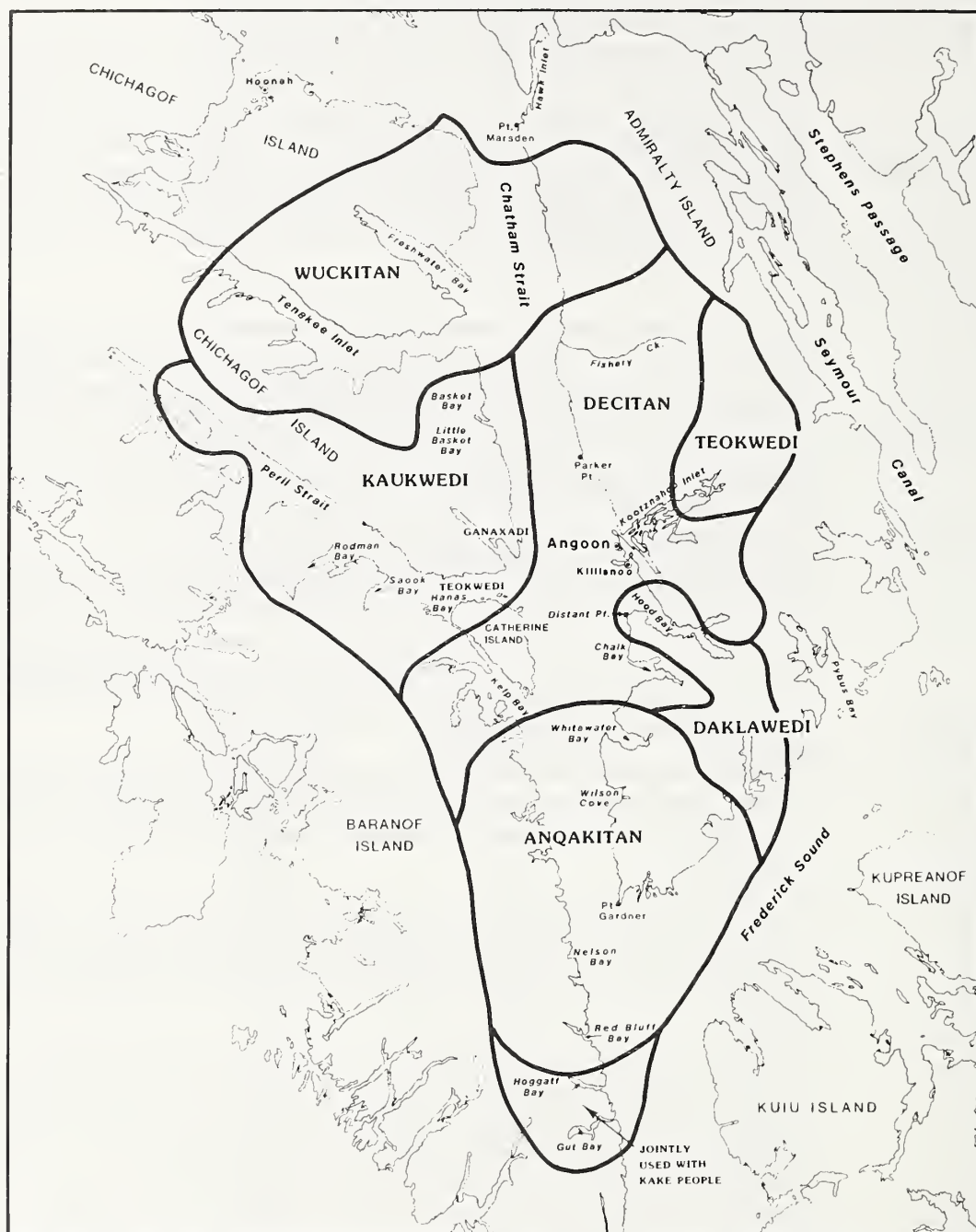
Although Angoon incorporated as a city in 1963, the contemporary village holds its clan structure largely intact and keeps Tlingit traditions alive. The community has a large proportion of life-long residents who value close family time, good housing, and hunting and fishing opportunities.

Angoon had a population of 630 in 1985, with 78 percent Alaska Native (George and Bosworth 1988). Employment is generally limited. Recreation and tourism opportunities have been improving since 1980 when the Admiralty Island National Monument was established. Some residents have jobs logging on land owned by the village or regional Native corporations.

Sources of employment include schools, 33 percent; government, 25 percent; fishing, 10 percent; and construction, 7 percent. Employment is highly seasonal in all sectors, and most of the male workforce worked for fewer than half of the weeks in 1979. The Tongass Resource Use Cooperative Study (TRUCS) reported a mean per capita income in 1987 of \$5,364, less than half that of the region as a whole (Kruse and Frazier 1988).

Angoon residents harvest deer, salmon, other fish, waterfowl, and shellfish among other resources. The annual harvest of subsistence resources was about 250 pounds per capita in 1987, dominated by deer (30 percent), salmon (29 percent), other finfish (14 percent), and other mammals (14 percent) (Figure 3-19). Subsistence provides almost 45 percent of the household food supply.

Figure 3-18
Traditional Use Area of the Angoon Tlingit



TRADITIONAL USE AREA OF THE ANGOON TLINGIT
adapted from Goldschmidt and Haas 1946

— Use Area Boundary

SCALE
0 5 10 15 20 Miles

SOURCE: ADF&G Subsistence Division.

Tenakee Springs

Tenakee Springs is located at hot springs on Tenakee Inlet in Chichagof Island, that were first known to Tlingit inhabitants of nearby villages. The word "Tenakee" comes from the Tlingit language and means either "twin cities" or "bay on the other side." The original winter village site was located in the vicinity of the present boat harbor, with a summer village site across the Inlet at Kadashan Bay. The Decitan Tlingit originally owned Tenakee Inlet, ceding the region to the Woosh Ki Taan to settle a murder. The Tlingit called the hot springs "Daay Axa" and Indian River "Klaa Gu Woo Aan Heen" (Leghorn and Kookesh 1987).

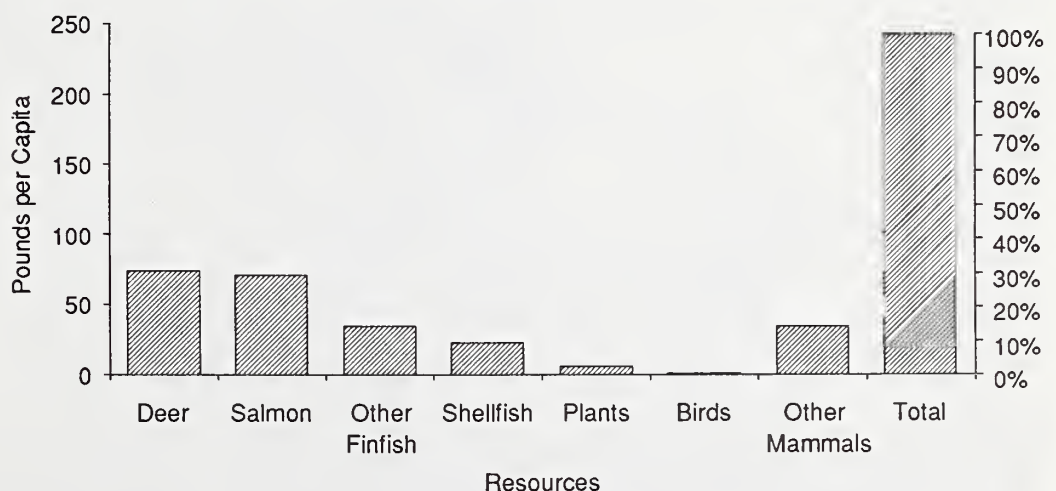
Tenakee was the site of a seasonal Tlingit village before being used in the late 1800s by prospectors who frequently wintered there. A permanent community eventually developed around the springs, offering such amenities as a store, post office, hot baths, and pool halls. Residents built cabins along a boardwalk and enclosed the springs in a concrete bath house.

A cannery was built near Tenakee in 1916, operating sporadically into the 1960s. Another nearby cannery opened in 1918 and closed in the late 1920s. A small crab cannery operated in the town until 1974. With the closing of the canneries, Tenakee Springs has become known as a retirement community for its core of older residents. More recently, however, a number of younger families have settled in Tenakee Springs, attracted by a rural lifestyle based on subsistence, gardening, and cottage industries. The population in 1984 was 156, with 5 percent Alaska Native.

Logging began at nearby Corner Bay in the early 1970s resulting in some growth for Tenakee Springs. Intermittent logging has also occurred in the Indian River drainage adjacent to town. The town supports a small commercial fishing fleet. Many houses in Tenakee Springs are used as retirement or vacation homes by residents of other Alaska communities bringing about 40 percent of the economy. Sources of employment by sector include retail, 36 percent; government, 25 percent; fishing and logging, 25 percent; and manufacturing, 14 percent. Employment is highly seasonal in all sectors other than government. The Tongass Resource Use Cooperative Study (TRUCS) reported a mean percapita income of just over \$9,000 in 1987.

Figure 3-19

1987 Harvest of Principal Subsistence Resources - Angoon



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

3 Affected Environment

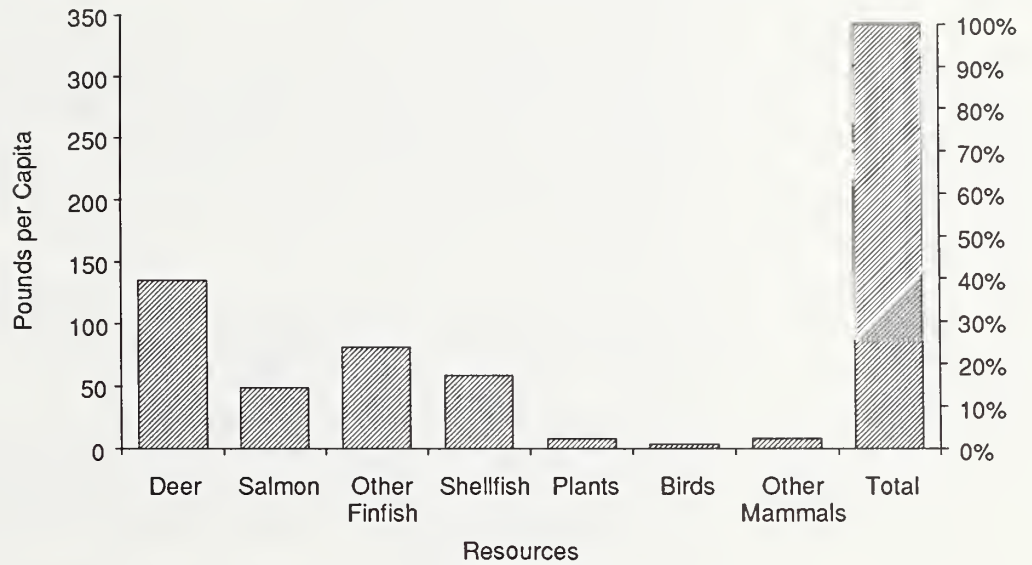
In pursuing traditional subsistence resources, Tenakee Springs residents hunt deer, bear, and seals; catch salmon and other finfish; collect shellfish; and trap furbearers. The annual harvest of subsistence resources was about 340 pounds per capita in 1987, dominated by deer (39 percent), other finfish (24 percent), shellfish (17 percent), and salmon (14 percent) (Figure 3-20). Subsistence provides just over 40 percent of the household food supply.

The Native Community of Angoon has Retained its Cultural Heritage



Figure 3-20

1987 Harvest of Principal Subsistence Resources - Tenakee Springs



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.



Sitka

Tlingit Indians have lived in the Sitka area for centuries, using its abundant natural resources. These resources also attracted the traders of many nationalities, and by 1799 Sitka was a favored trading location. In that year, Alexander Baranof, manager of the Russian-America Company, bargained with the local Tlingit chief of the Ki Ksadi clan for land to build the headquarters of his fur trading business. Baranof built a fort near the present site of Sitka and named it Saint Archangel Michael.

Tensions developed between the Russians and Tlingits, who attacked and captured the fort in 1802. Baranof returned in 1804 to retake the fort, engaging the Tlingits in a battle near the beach at Indian River. After several days of fighting and negotiations, the Tlingits abandoned the battle site and fled the area. They broke up into small groups based on clan lineage. One group went north up the west coast of Chichagof Island. Two groups went east through the mountains. One of the latter groups settled at the mouth of Sitkoh Bay near Point Craven. The village they built behind a steep rock face was named Sitkoh.

The Russians built a new settlement at the present location of Sitka, calling it New Archangel, and the Tlingits returned to Baranof Island (including Sitkoh Bay) in 1821. Sitka remained the capital of the Russian America until 1867 when the United States purchased Alaska. By then, many of the area's Tlingit population had moved to Sitka.

Sitka became the capital of the territorial government in 1884. Shipping, nearby gold strikes, a sawmill, and a salmon cannery that opened in 1878 all contributed to the economy. When the territorial capital moved to Juneau in 1906, Sitka depended almost entirely on fishing and fish processing; the first cold storage plant opened in 1913, followed by more canneries and a short-lived whaling station.

During World War II, military activities took place in Sitka. The creation of the Mt. Edgecumbe boarding school established the town as a center of Native education and arts. The lumber industry started growing in 1959 with the construction of the large APC pulp mill. Timber processing has remained a major economic sector in Sitka.

The local economy includes a mixture of manufacturing (lumber, seafood), government, services, and fishing. The sector including trade and services has grown the fastest since 1970. Employment includes government (about 45 percent), services (20 percent), manufacturing (about 15 percent), and retail, (14 percent). Employment in the manufacturing and construction sectors is seasonal. In 1984, unemployment ranged between about 7 and 14 percent. The Tongass Resource Use Cooperative Study (TRUCS) reported a mean per capita income in 1987 of about \$14,500, higher than that for the region as a whole (Kruse and Frazier 1988).

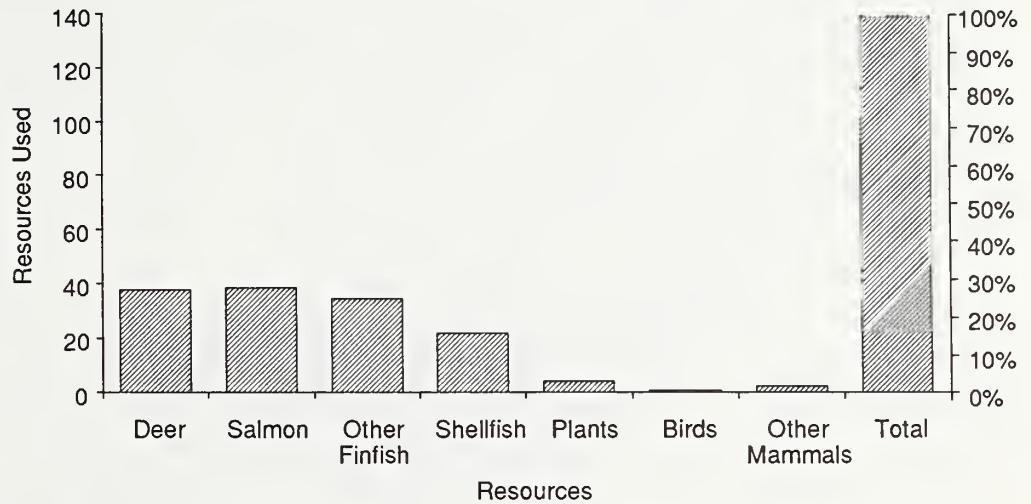
Sitka residents harvest a wide variety of resources including deer, bear, goat, seal, waterfowl, furbearers, salmon, marine fish, and shellfish, among others. The annual harvest of subsistence resources was about 140 pounds per capita in 1987, dominated by salmon (28 percent), deer (27 percent), other finfish (25 percent), and shellfish (16 percent) (Figure 3-21). Subsistence provides about 15 percent of the household food supply.

Hoonah

Hoonah has been a principal winter camp for the Huna Tlingits of the Glacier Bay/Icy Straits Area for centuries. The town site is protected from winter storms and provides good access to subsistence resources. Historically, the community was populated by three Tlingit Clans: Chukanei Dee, T'Akdeintaan, and Woosh Ki Taan Clans (see Figure 3-22). Huna Tlingits exerted some control over the sea otter fur trade that moved through Chatham Strait and Lynn Canal.

In 1880, a store was built in Hoonah and in the following year missionaries settled in the town, establishing the Presbyterian Home Mission church and school. Commercial fishing began with the development of salteries and canneries near Hoonah; in 1912 a cannery was built a mile north of the community; a cold storage facility still operates in Hoonah.

Figure 3-21
1987 Harvest of Principal Subsistence Resources - Sitka



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Today, fishing and fish processing are the principal industries for Hoonah. In 1986, the population of Hoonah was 960, and 71 percent of the population was Alaska Native. In recent years, Hoonah has become the center of logging activities on northern Chichagof Island. Logging is taking place on National Forest lands as well as land owned by the Huna Totem and Sealaska Corporations. A religious farming community also has become established at Game Creek, just south of Hoonah. Major sources of employment by industry are: fish and fish processing, 50 percent; retail, 11 percent; school, 10 percent; government, 8 percent; logging, 8 percent; and transportation, 1 percent.

Employment is highly seasonal in all areas except government, with more than 40 percent unemployed during a 1985 survey. Although the average income was about \$13,000, more than 40 percent reported an income of less than \$5,000 (ADF&G 1989). The Draft Tongass Resource Use Cooperative Study (TRUCS) reported a mean per capita income of about \$9,350 in 1987 (Kruse and Frazier 1988). Hoonah residents hunt deer, goats, seals, waterfowl and other birds; trap furbearers; catch salmon and other finfish; and gather shellfish, berries, and seaweed. The annual harvest of subsistence resources was about 400 pounds per capita in 1987, dominated by salmon (26 percent), deer (23 percent), and other finfish (19 percent) (Figure 3-23). Subsistence food provides about 50 percent of the household food supply.

Wrangell

Wrangell, located in the east-central portion of southeast Alaska, is on the northern tip of Wrangell Island, about seven miles from the mouth of the Stikine River. The Stikine is one of only a few major rivers that cut through the massive coastal mountains providing access into Canada. Historically, it has been an important trade route. Tlingit people from a major village 13 miles from the present site of Wrangell used the Stikine to trade with the Athapaskans in the Interior.

Figure 3-22
Territories of Hoonah Tlingit Clans, 1946



**TERRITORIES OF HOONAH
TLINGIT CLANS, 1946**



STATE OF ALASKA
DEPT. OF FISH AND GAME
Subsistence Division



CHUKANEI DEE

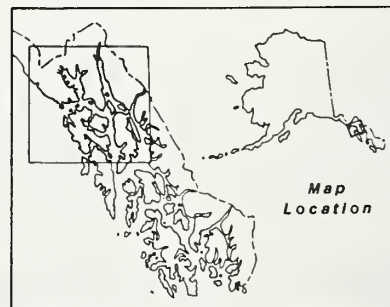


T'AKDEINTAAN



WOOSH KI TAAN

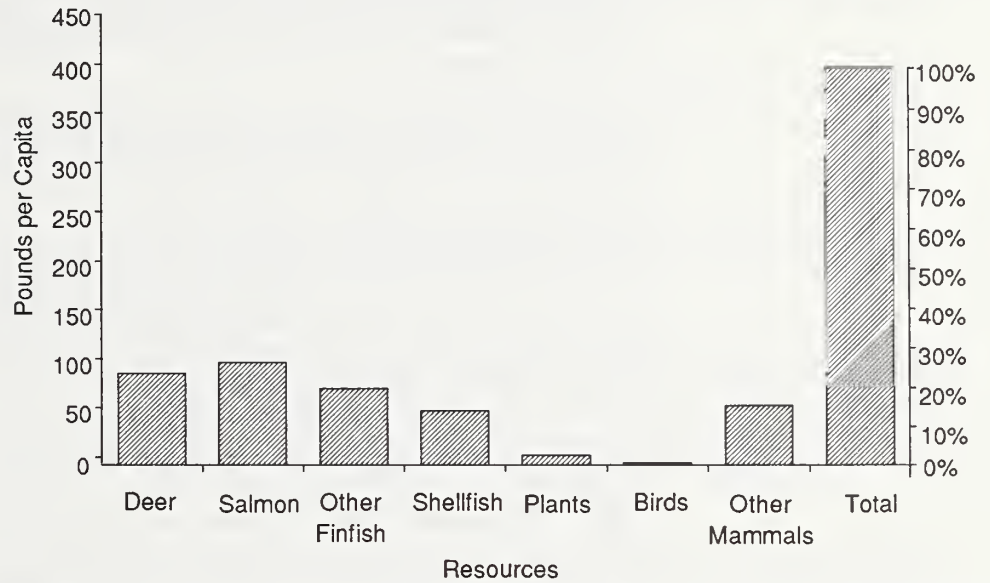
Source: Radrawn from Goldschmidt and Haas, 1946. Original data were based on field interviews with Tlingit elders in Hoonah, 1945 and review of historical documentation of clan territory.



Map
Location

SOURCE: ADF&G Subsistence Division.

Figure 3-23
1987 Harvest of Principal Subsistence Resources - Hoonah



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Russian traders and Canadians were also interested in the Wrangell area. The Russians were first to build a fort, but then leased the land to the Hudson Bay Company. Under a British flag, Wrangell became a major trading center in the area.

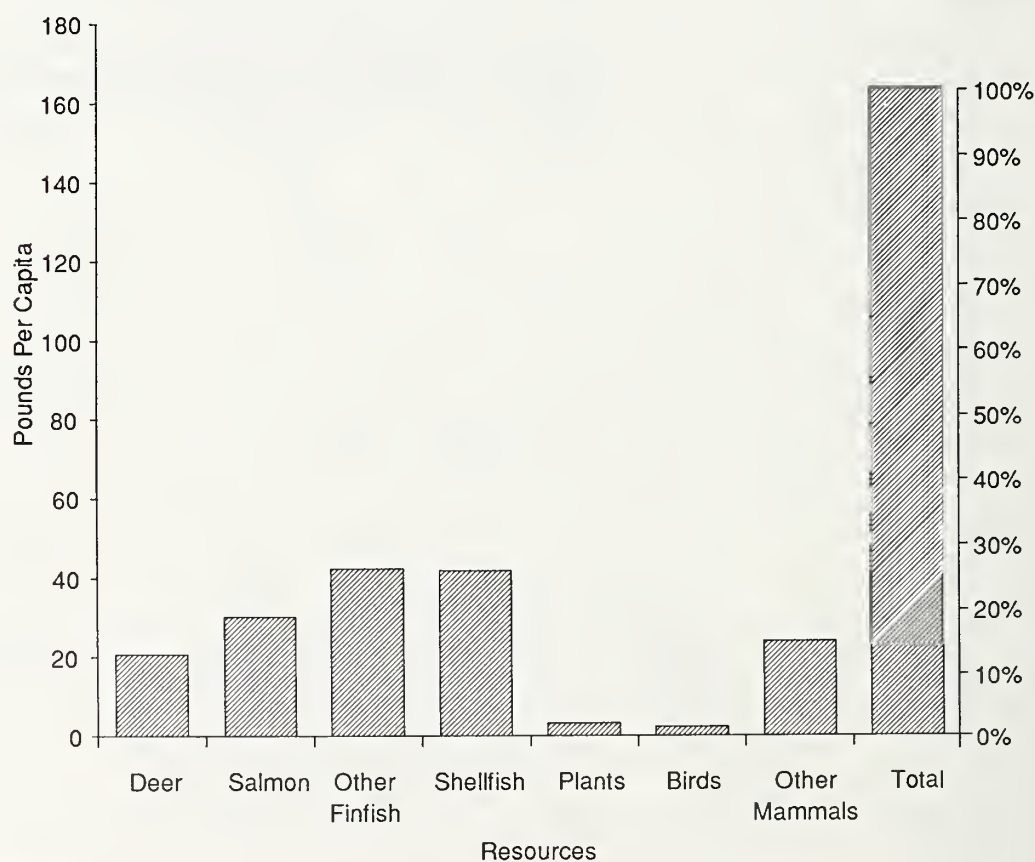
Wrangell was a jumping-off point for three successive gold rushes. The boom and bust cycles of the mining affected its growth and economy. By the time the third strike had run its course, though, two canneries and a sawmill were established. Today it is an active fishing and timber-processing town.

The 1985 population of 2,836 was almost 40 percent Alaska Native. The major sources of employment include: government, 25 percent; retail trade, 19 percent; manufacturing, 16 percent; fishing and fish processing, 13 percent. Employment in the tourism, retail, and fishing sectors is seasonal.

Wrangell residents hunt deer, moose, bear and waterfowl, fish for salmon, halibut, and other marine fish, and gather shellfish and berries. The annual harvest of subsistence resources was about 165 pounds per capita in 1987, dominated by shellfish (25 percent), salmon (18 percent), and other finfish (26 percent). (Figure 3-24). Subsistence resources provide about 23 percent of the household food supply.

Figure 3-24

1987 Harvest of Principal Subsistence Resources - Wrangell



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Klukwan

Klukwan is a Chilkat Indian village located next to the Chilkat River, about 22 miles north of Haines. Due to its strategic location in the Chilkat River valley, Klukwan has a long history as a trade center. Klukwan represents the population center of a Tlingit tribe that numbered over 1000 individuals in 1880 and occupied five villages in the Chilkat Valley and peninsula. Today, the Chilkat Tlingits are divided into two groups; the Chilkats of the Chilkat Valley, centered around Klukwan, and the Chilkoots who live in and near Haines on the Chilkat Peninsula.

During the gold rush in the late 1800s, the Chilkat valley was a supply route for Dawson. Little development has taken place in the area since, despite the discovery of a rich iron ore deposit.

In 1988 the population was 132, with 82 percent Alaska Native. The major sources of employment included: forest and fish products, 51 percent; logging camps and contractors, 24 percent; home crafts, 25 percent, and communications, 1 percent. Employment is highly seasonal in all sectors.

In pursuing traditional subsistence customs, residents of Klukwan hunt moose, deer, black bear, mountain goats, seals, grouse, and waterfowl, fish for salmon, eulachon, and other fish, and gather clams and berries. The annual harvest of subsistence resources was about 239 pounds per capita in 1987, dominated by salmon (52 percent), and other finfish (34 percent) (Figure 3-25). Subsistence provides 28 percent of the household food supply.

Petersburg

Located in the east-central portion of Southeast Alaska, Petersburg is situated on the north-west shore of Mitkof Island, at the north end of Wrangell Narrows. Historic use of the Petersburg area was made by the Tlingit people from nearby Kake. They had established a summer fishing camp on north Mitkof Island that was still active when white settlers began to move into the area. The area around present-day Petersburg has been in continuous use by Tlingits since prehistoric times.

In the late 1890s, Peter Buschmann, a Norwegian fisherman from Tacoma, homesteaded a site with good potential for a year-round fish-processing industry. He liked the well-protected harbor, available timber, and a ready supply of ice from the Le Conte Glacier, only 25 miles away. Buschmann started the Icy Strait Packing Company cannery and by 1900 a community had grown. In its first season of operation, the cannery packed 32,750 cases of salmon. Buschmann's community, named Petersburg, grew rapidly. A sawmill, packing house, and docks were added and it soon became a center for fishing and fish processing. In contrast to the boom and bust mining towns, Petersburg became a stable year-round community. Except for a slight decline in the 1950s, the community grew steadily. Today, Petersburg is an active fishing community with fishing, fish processing, and timber being the predominant industries.

The 1987 estimated population of 3,282 residents (Smythe 1988) was about 13 percent Alaska Native (ADF&G 1989). The major sources of employment include seafood processing/manufacturing, 36 percent; government, 28 percent; retail trade, 13 percent; and construction, 9 percent. Employment in the manufacturing, retail, and construction sectors is seasonal. The average income is over \$19,000 and unemployment was about 16 percent of the total population. (ADF&G 1989).

Local subsistence resource use includes deer, bear, moose, salmon, other fish, waterfowl, clams, crabs, and berries. The annual harvest of subsistence resources was about 203 pounds per capita in 1987, primarily for salmon (23 percent), other finfish (22 percent), and deer (22 percent). (Figure 3-26). Approximately 30 percent of the household food supply is provided by subsistence resources.

Kake

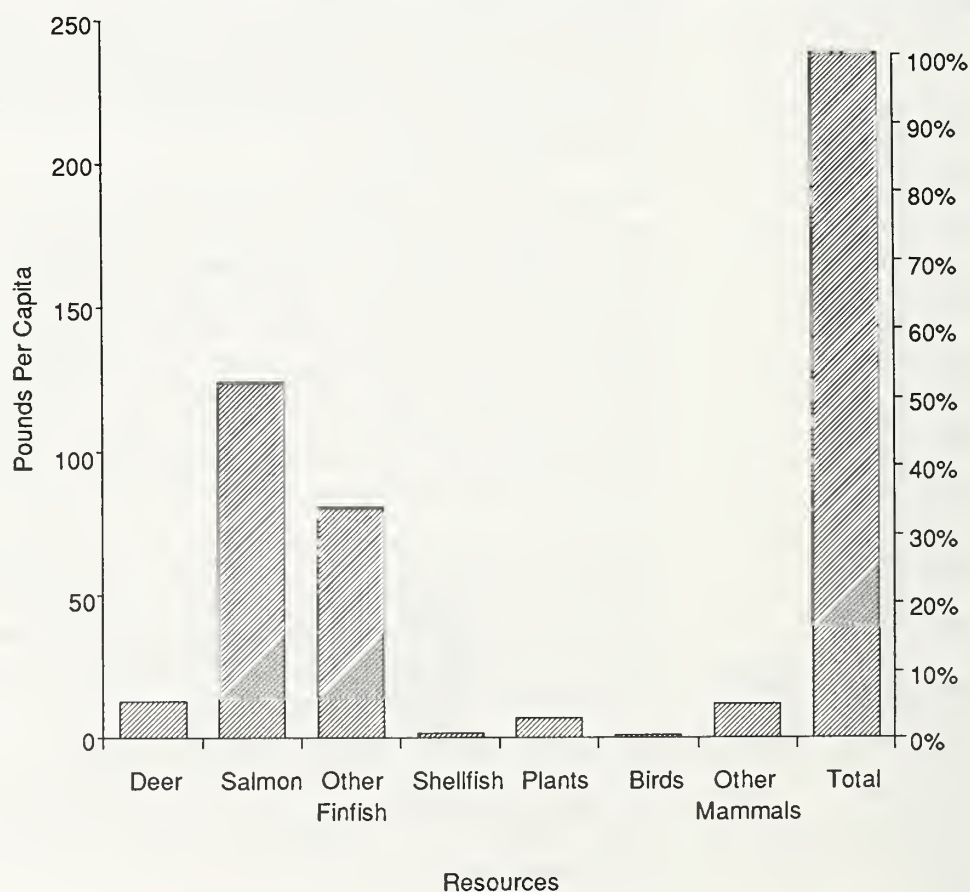
Kake is located on northwestern Kupreanof Island. Kake was one of many villages occupied by the Kake Tlingits in the 18th and 19th centuries. In the mid-1800s, the Kake Tlingits inherited traditional and customary aboriginal rights to portions of Kuiu Island. These additional land rights are believed to have included the northern one-third of Kuiu and joint rights with the Klawock Tlingits to the central portion of the island.

With a major camp on Security Bay (VCU 400), the Kake people used Analysis Area 12 extensively for gathering, fishing, and hunting. Resources utilized included chum salmon, Sitka black-tailed deer, wild and cultivated plants, and a full range of invertebrates. Permanent and seasonal settlements were also located in Saginaw Bay (VCU 399), Port Camden (VCU 420) and in Rocky Pass (VCU 428). In the areas of Three-Mile Arm and Conclusion Island (VCUs 417, 418 and 419) they built cabins and smokehouses and practiced gathering, fishing, trapping, and hunting. The Kake Tlingits used the Washington Bay area (VCU 401) for harvesting herring. Rowan and Pillar Bays (VCUs 402 and 403) were additional gathering, fishing, hunting, and trapping areas.

Several historic Tlingit villages and fishing camps were consolidated during the late 1800s and early 1900s at the village of Kake, primarily in response to compulsory schooling laws. A school and store were built in 1891, and a cannery built in the area in 1912 still operates. A cold storage was built in 1980.

Figure 3-25

1987 Harvest of Principal Subsistence Resources - Klukwan



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

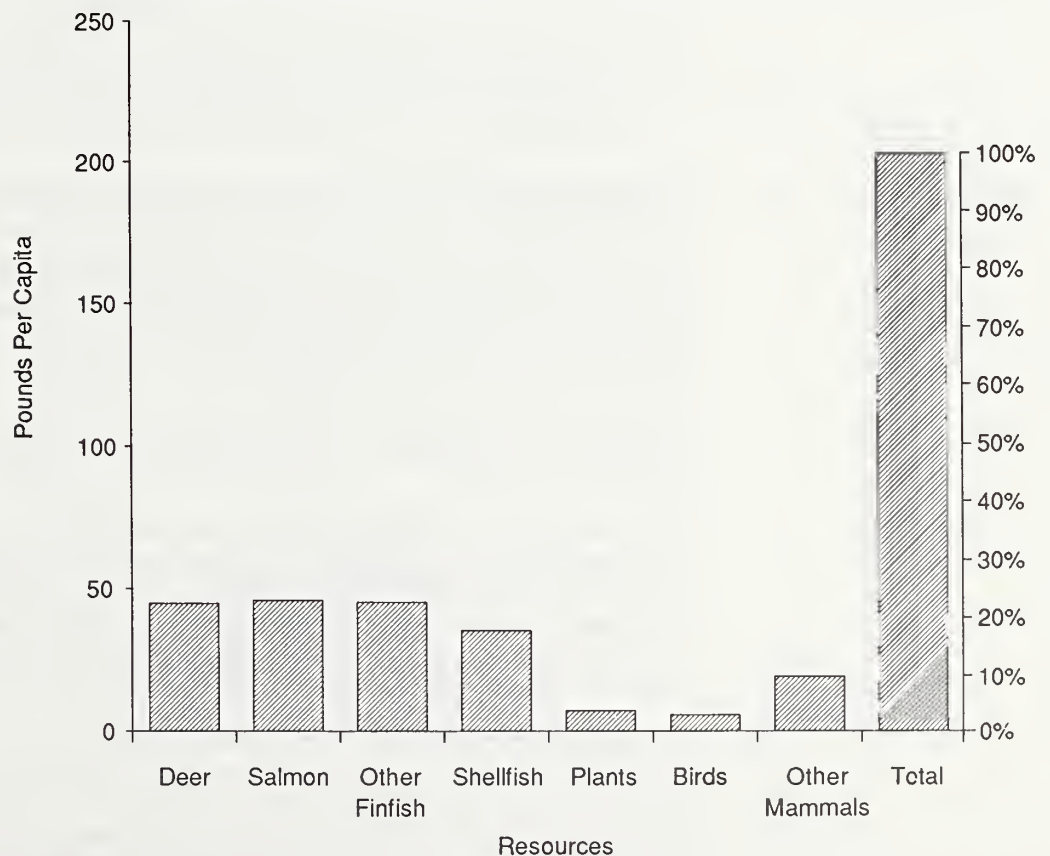
Historically, Kake's economy was based largely on commercial fishing of salmon, halibut, and trout from nearby waters. Logging has taken place in the area since the 1940s. In recent years, logging on land owned by the village corporation has provided some employment opportunities for Kake residents. Logging activities on both private and public lands have resulted in a local road system that residents use to access fishing, berrying, and grouse hunting areas.

The 1985 population of 634 was almost 70 percent Alaska Native. The major sources of employment include: fishing and fish processing, 28 percent; logging, 18 percent; longshoring, 13 percent; school, 8 percent; and government, 1 percent. Employment is highly seasonal with more than 50 percent unemployed during a 1985 survey. Although the average income was about \$16,000, almost 40 percent reported no income (ADF&G 1989). The Tongass Resource Use Cooperative Study (TRUCS) reported a mean per capita income of about \$9,000 in 1987 (Kruse and Frazier 1988).

In pursuing traditional subsistence, Kake residents hunt deer, bear, seals, grouse, and waterfowl, fish, trap furbearers, and gather shellfish, seaweed, and berries. The annual harvest of subsistence resources was about 160 pounds per capita in 1987, dominated by deer (24 percent), salmon (22 percent), and other finfish (21 percent) (Figure 3-27). Subsistence provides just over 20 percent of the household food supply.

Figure 3-26

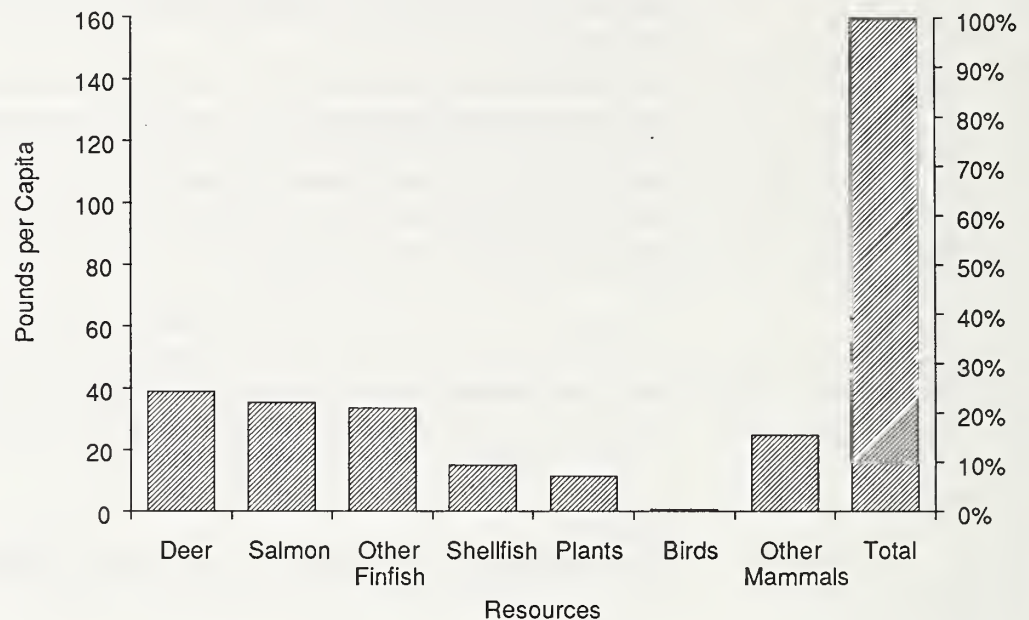
1987 Harvest of Principal Subsistence Resources - Petersburg



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Figure 3-27

1987 Harvest of Principal Subsistence Resources - Kake



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Haines

Haines is located along the Lynn Canal on the narrow Chilkat Peninsula between Chilkoot and Chilkat Bays. The community is in the northern portion of Southeast Alaska.

The Chilkat Tlingits first occupied the Chilkat Valley area and controlled the trails between the coast and the Interior. Today, the Chilkat Tlingits are divided into two groups: the Chilkats of the Chilkat river drainage, with Klukwan being the major population center, and the Chilkoots living in and near Haines.

In 1879, John Muir and S. Hall Young, a Presbyterian missionary, visited the area looking for a mission site. Subsequently, the Willard Mission was built in 1881 and renamed Haines in 1884.

With the Klondike Gold Rush of 1898, Haines grew as a mining supply center. Gold was also discovered 36 miles from Haines in the Porcupine District in 1899. The area was mined actively until the mid-1920s. As a result of law enforcement problems associated with the gold rush, an army fort was established in 1905. The fort was deactivated in 1945. The community has since developed as a fishing port with some timber harvesting and processing which occasionally add to the community's employment opportunities.

The population of Haines and vicinity was 1,638 in 1988 with only 9 percent Alaska Native (ADF&G 1989). The major sources of employment include: government and schools, 23 percent; retail trade, 21 percent; construction, 9 percent; transportation, 8 percent; fishing and forestry, 5 percent; and tourism, 4 percent. Employment is highly seasonal in most industries with the exception of government and schools, and transportation. The average income of Haines' residents is over \$17,000 but 20 percent of the population had an income between \$5,000 and \$9,999 (ADF&G 1989).

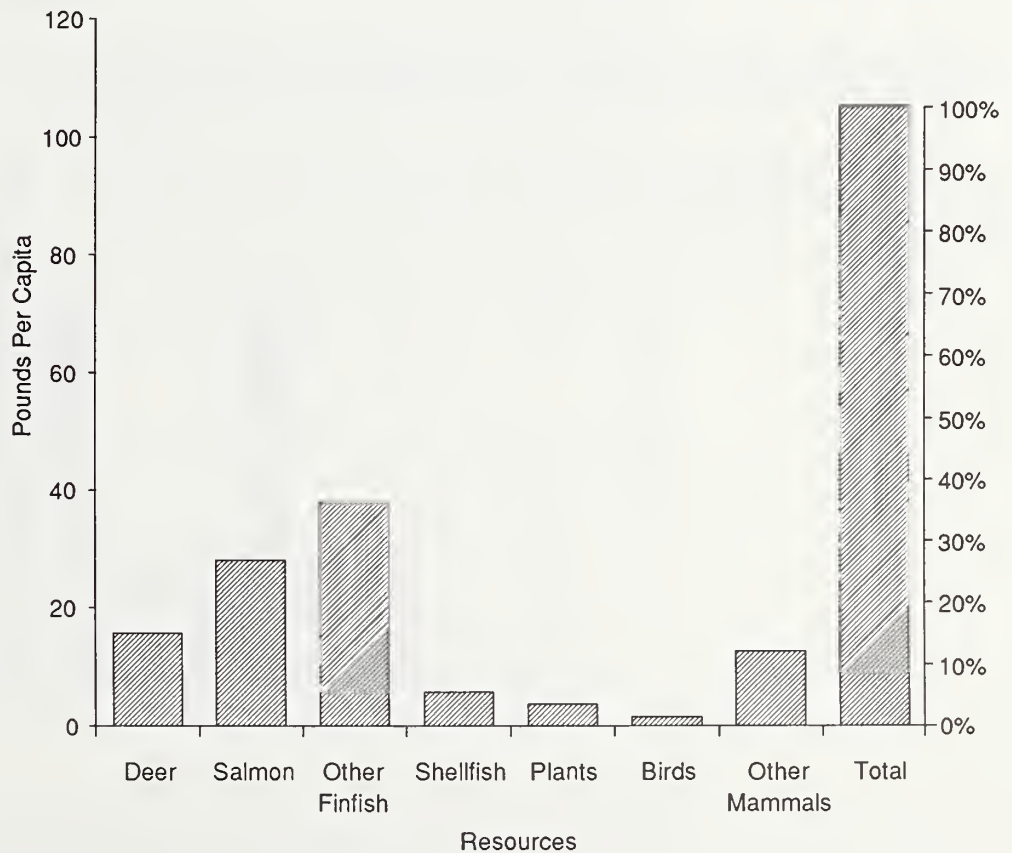
Use of Analysis Area VCUs

Local subsistence resource use includes deer, bear, mountain goats, moose, salmon, other marine fish, eulachon, trout, and waterfowl. The annual harvest of subsistence resources was about 105 pounds per capita in 1987, dominated by finfish other than salmon (36 percent), salmon (27 percent), and deer (15 percent) (Figure 3-28). Subsistence provides about 20 percent of the household food supply.

All of the VCUs in Analysis Area 6 are used by more than one user community. Subsistence use areas in Analysis Area 6 are shown on the Important Subsistence Use Map folded at the back. This map only shows use of the Analysis Area for subsistence harvest of deer, salmon, and furbearers. The map information is based on University of Alaska, Forest Service, Region 10, and ADF&G subsistence survey data. Data sources include the TRUCS survey and ADF&G Technical reports (complete citations are found in Chapter 7, Literature Cited). All the communities and households that use an area have been given equal weight in the mapping process. Therefore, the map shows areas of subsistence use without reference to which communities may be using a particular location and without indications of the intensity or frequency of that use. All inventory data, including both intensive and extensive use areas, were considered in developing the subsistence use map. These data are available for review in the Planning Record.

Figure 3-28

1987 Harvest of Principal Subsistence Resources - Haines



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

As Figure 3-29 shows, Angoon residents hunted deer in almost all of the VCUs in 1987 except the Kadashan and Corner Bay areas. They caught crab and salmon in fewer than half of the VCUs, primarily the Basket Bay, Sitkoh Bay, and Peril Strait areas. Trapping was limited to the Sitkoh Bay area.

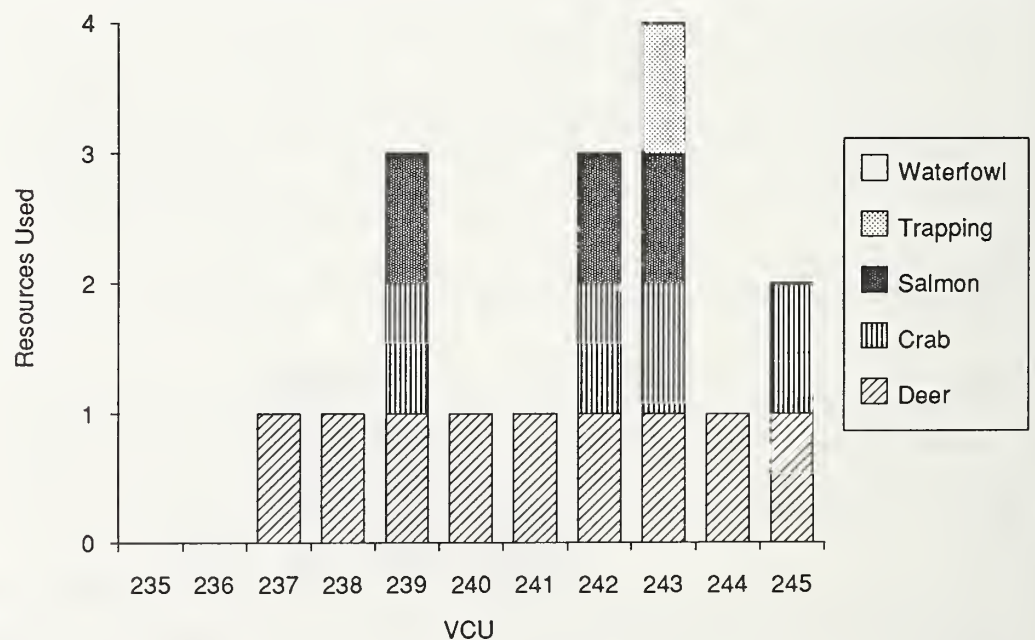
Tenakee Springs residents primarily hunted deer and waterfowl and trapped furbearers in VCUs along Chatham Strait (Figure 3-30). They caught salmon in Kadashan and Basket Bays and crabs in Kadashan and Corner Bays.

Residents of Sitka hunted deer throughout the entire Analysis Area and caught salmon in the Basket and Sitkoh Bay areas (Figure 3-31). Residents of Klukwan also used Analysis Area 6 only for harvesting deer and salmon in 1987. Klukwan residents used the VCUs that border Chatham Strait (VCUs 238 through 242) for deer hunting and the Basket Bay and Little Basket Bay areas for salmon fishing (Figure 3-32).

Hoonah residents primarily used the northwest portion of Analysis Area 6 along Tenakee Inlet and Chatham Strait for subsistence activities (Figure 3-33). Although Hoonah residents did not hunt deer in Analysis Area 6 in 1987, they did catch salmon and trap furbearers in VCUs 235, 236, and 237. They also trapped in VCU 238 and caught salmon in VCUs 239, 240 and 241 (Figure 3-34).

Wrangell residents hunted deer in most of the VCUs in Analysis Area 6 in 1987. They caught salmon in most VCUs except those along Tenakee Inlet. Residents of Wrangell collected shellfish and crabs in VCUs bordering Tenakee Inlet as well as Basket Bay and Peril Strait (Figure 3-35).

Figure 3-29
Angoon Use of Analysis Area VCUs

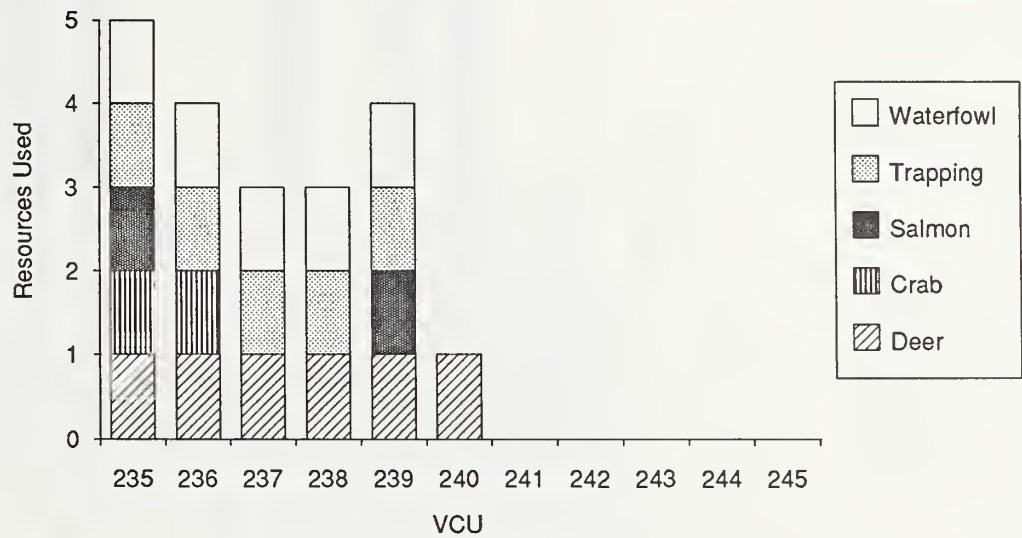


SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

George, G. and R. Bosworth. 1988. Use of fish and wildlife by residents of Angoon, Admiralty Island, Alaska. ADF&G, Division of Subsistence, Technical Paper No. 159.

Figure 3-30

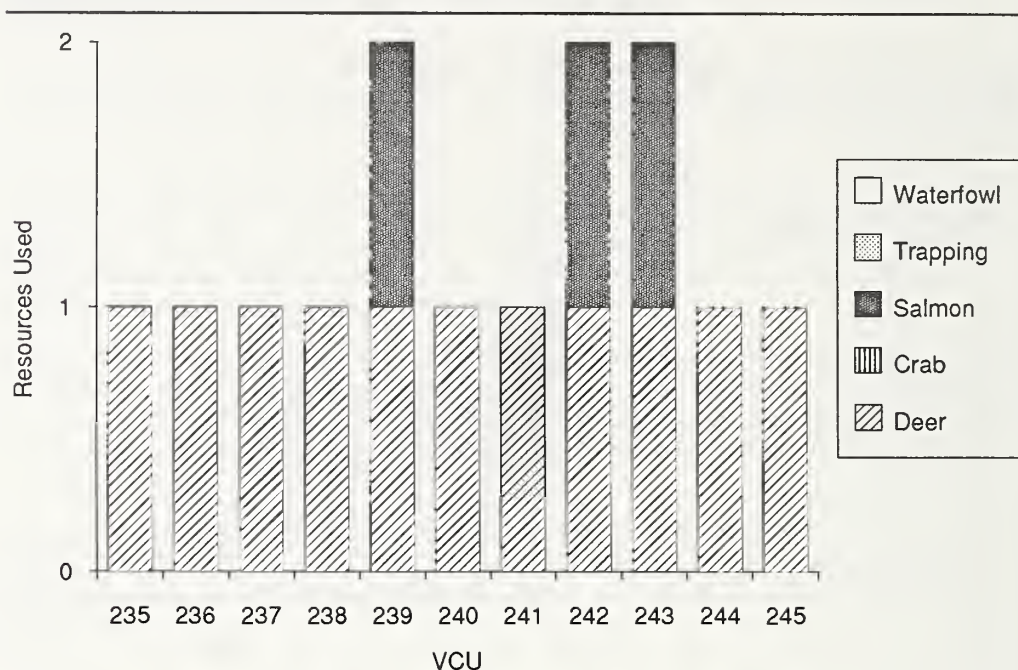
Tenakee Springs Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Kookesh, M. and K. Leghorn. 1985. Timber management and fish and wildlife utilization in selected Southeast Alaska communities: Tenakee Springs, Alaska. ADF&G, Division of Subsistence, Technical Paper No. 138.

Figure 3-31
Sitka Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Gmelch, G. and S. B. Gmelch. 1985. Resource use in a small Alaska city -- Sitka. ADF&G, Division of Subsistence, Technical Paper No. 90.

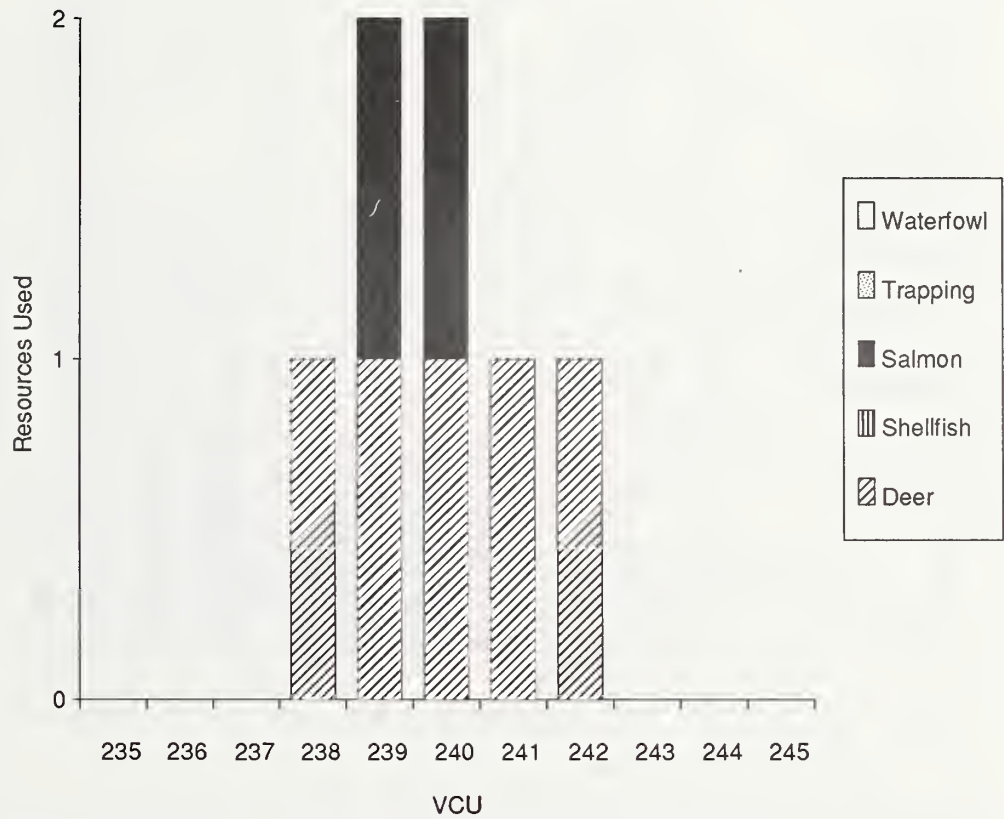
Residents of Petersburg hunted deer in more than half of the VCUs in Analysis Area 6 (VCUs 238, 239, and 241 through 245) but only hunted waterfowl in one VCU in the Sitkoh Bay area (VCU 243). Residents of Haines and Kake only hunted deer in Analysis Area 6 in 1987. Haines residents hunted in VCUs 235 through 238, primarily along Tenakee Inlet. Kake residents hunted in all VCUs except VCU 235, Kadashan Bay.

Major Harvest Area 36 includes portions of Analysis Area 6 and other analysis areas that border Tenakee Inlet, including the City of Tenakee Springs. Major Harvest Area 33 includes the south and southeast portions of Analysis Area 6 as well as other analysis areas that border on Peril Strait and Hoonah Sound.

The demand for deer has increased in recent years. Both the number of deer hunters (Table 3-10) and the number of deer harvested (Table 3-8) have nearly doubled in Major Harvest Areas 33 and 36 (Figure 3-2) between 1984 and 1987. These increases are partially a result of increased access due to road building on federal land. Recent changes in hunting regulations have also contributed to the increase in the number of deer harvested. Since the number of deer hunters includes both sport and subsistence hunters, an increase in the number of hunters leads to an increase in competition for the resource.

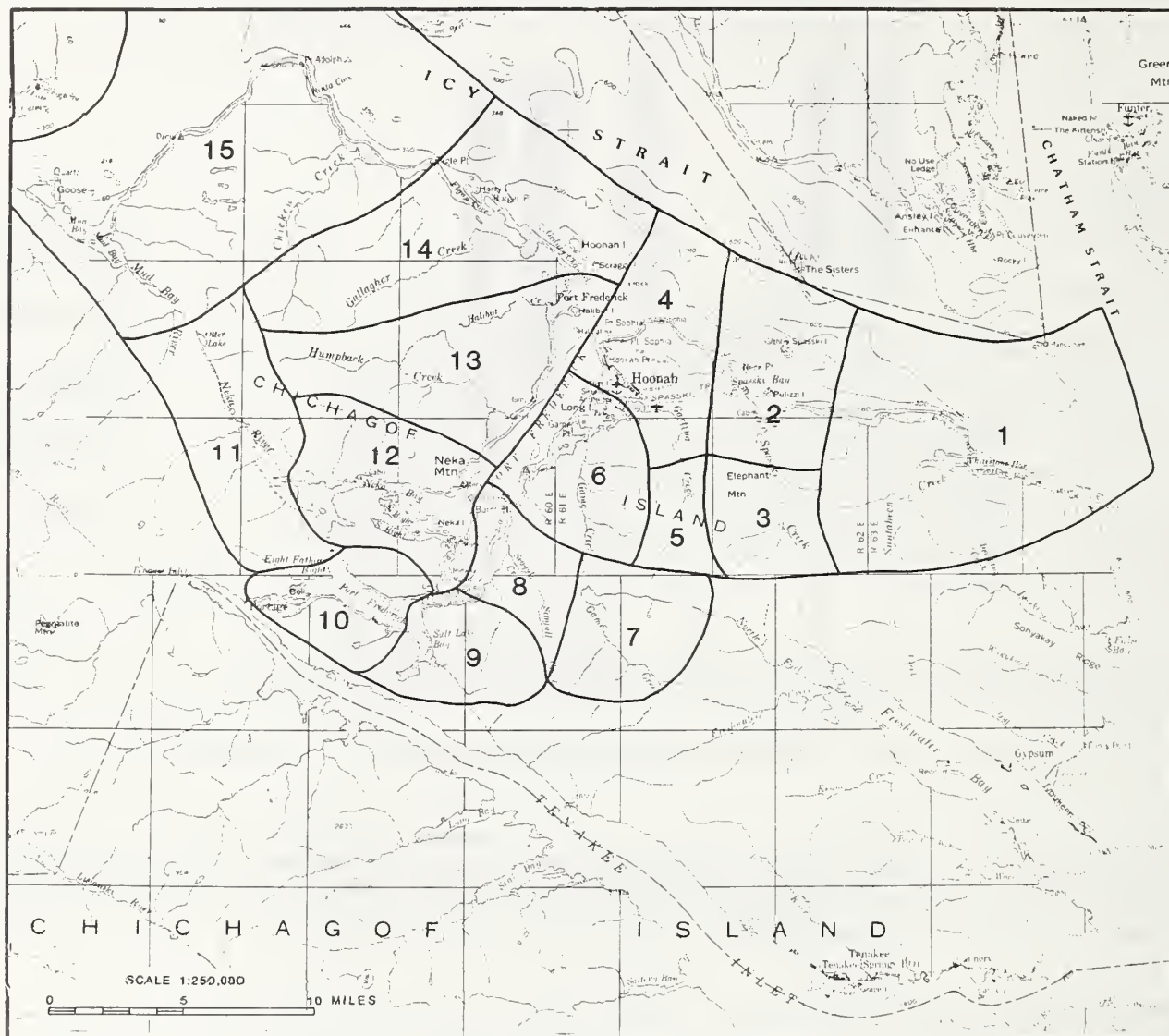
Table 3-30 provides information on the average numbers of hunter days needed to harvest deer in Major Hunting Unit 33 during the period 1985 to 1987. Angoon residents hunted relatively infrequently in the unit, and the average number of days they needed to harvest a deer remained unchanged between 1985 and 1987. Most hunter days in the unit came from Juneau-Douglas residents who averaged about 1.6 hunter days per deer in 1985, 2.2 in 1986, and 2.3 in 1987.

Figure 3-32
Klukwan Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Fraizer. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Figure 3-33
Hoonah Subsistence Core Use Areas



DIVISION OF THE CORE AREA
NEAR HOONAH USED BY
RESIDENTS FOR SUBSISTENCE
HARVEST INTO 15 STUDY UNITS.

Sources: Bob Schroeder and Matt
Kookesh, field research 1986, 1987.

Unit boundaries were developed
through key informant interviews
with Hoonah residents. Boundaries
correspond to Forest Service manage-
ment units and ADF&G management
units where possible.

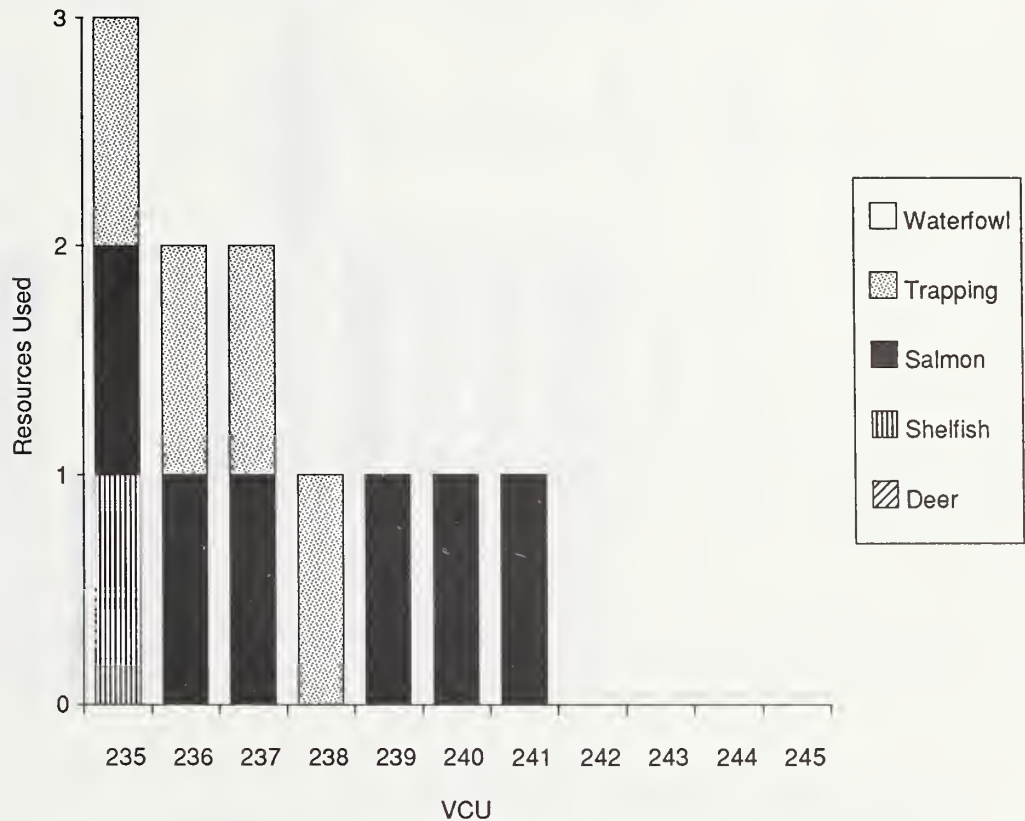
GEOGRAPHICAL UNIT
BOUNDARY

This map delineates the 15 geogra-
phical units that comprise the Hoonah
core area, these are used to analyze
frequency of subsistence use over
time. The same units are found on
map 16 at a different scale.



SOURCE: ADF&G Subsistence Division.

Figure 3-34
Hoonah Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Fraizer. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

Schroder, B. and M. Kookesh. 1988. Areas of subsistence use -- Hoonah. ADF&G, Division of Subsistence, unpublished draft, Technical Paper No. 142.

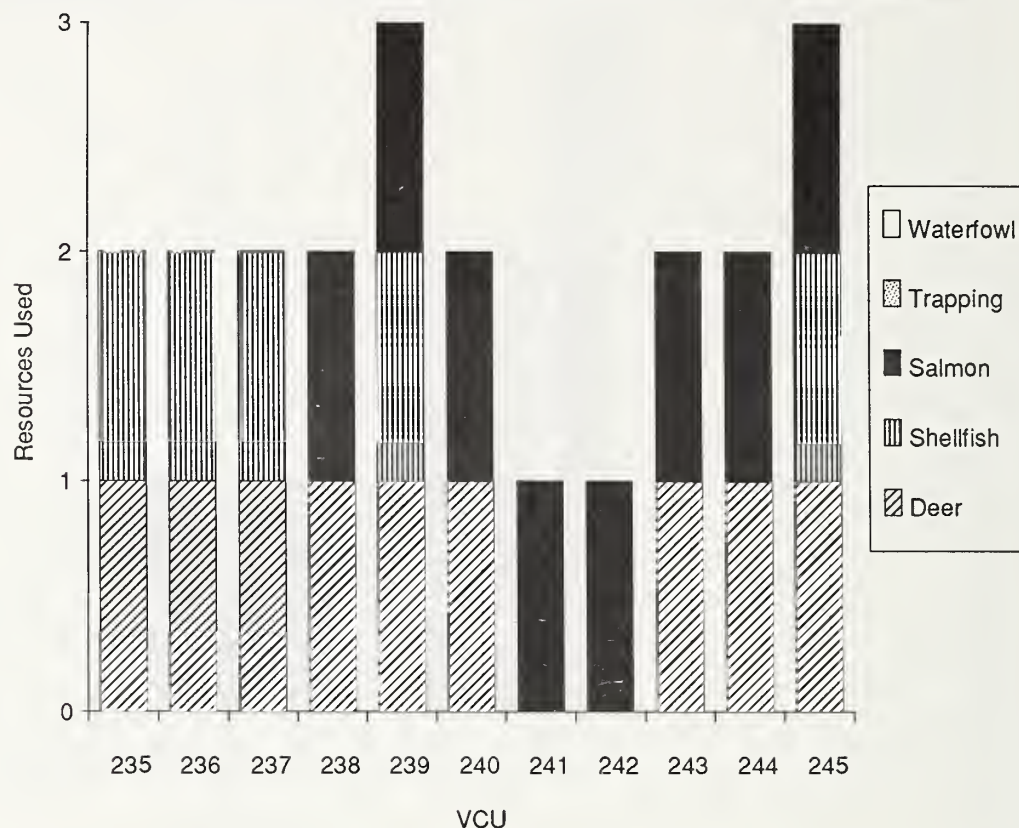
Table 3-31 provides information on the average numbers of hunter days needed to harvest deer in Major Hunting Unit 36 during the period 1985 to 1987. For Tenakee Springs, the average climbed sharply from 2.4 to 6.0 and then dropped back to 2.7. By contrast, the average for Juneau-Douglas raised gradually from 2.4 to 2.7, ending at 3.3.

In 1988, Alaska Fish and Game redrew the boundaries of the Major and Minor Harvest Areas in Major Harvest Area 36 to more accurately reflect use patterns. At the same time the sport hunting regulations were changed to shorten the season and lower the bag limits to reduce competition with subsistence hunters. Therefore, data on hunter days and number of deer harvested in 1988 are not directly comparable with previous years.

In 1988 there were a total of 4,694 hunter days and a total of 2,330 deer harvested in Major Harvest Areas 33 and 36. The total number of deer harvested decreased from previous years, but the reasons for the change are obscured by the new reporting boundaries.

Much of the observed increases have occurred in Major Harvest Area 36. Tenakee Springs in Analysis Area 3, is the nearest point of ferry service and it is only a short trip by boat across Tenakee Inlet to Analysis Area 6. Therefore, it is reasonable to expect areas along Tenakee Inlet to receive more use than other parts of Analysis Area 6. Basket Bay and Sitkoh Bay are

Figure 3-35
Wrangell Use of Analysis Area VCUs



SOURCE: Kruse, J. and R. Fraizer. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska, Anchorage, in cooperation with ADF&G Division of Subsistence.

considered to be dangerous to travel to because of the limited availability of safe harbors enroute. Some residents of Tenakee Springs access the road system in Analysis Area 6 with ATVs that they transport across Tenakee Inlet by skiff. However, most of the hunting by members of all communities that use Analysis Area 6 occurs along the beach fringe and river valleys accessible by boat (Leghorn and Kookesh 1987).

In summary, many of the Tenakee Springs households interviewed in the recent Tongass Resource Use Cooperative Survey expressed concerns about the potential effects on subsistence resources resulting from forestry management and fish and wildlife management activities on National Forest lands. They are especially concerned about effects on habitat, the effects of hunting and fishing regulations, and the effects additional access would have on important fish and wildlife subsistence species. Angoon and Sitka households interviewed were not as concerned about forestry management activities but are definitely concerned about the effects of hunting and fishing regulations. Comments from Sitka residents concerning logging activities covered the importance of supplying logs for the pulp mill, protecting salmon streams, and avoiding clear cutting.

All of the subsistence communities of Analysis Area 6 are concerned about the ability to continue to harvest important subsistence resources in this subsistence area. Chapter 4 evaluates the potential site-specific effects on subsistence use for each proposed alternative in this important subsistence area.

Table 3-30

Deer Hunter Days, Harvest, and Average Number of Hunter Days to Harvest in Major Harvest Area 33, 1985-1987¹

	1985			1986			1987		
	<i>Hunter Days</i>	<i>Deer Harvest</i>	<i>Avg. Days</i>	<i>Hunter Days</i>	<i>Deer Harvest</i>	<i>Avg. Days</i>	<i>Hunter Days</i>	<i>Deer Harvest</i>	<i>Avg. Days</i>
Angoon	76	69	1.1	0	0	0	108	95	1.1
Sitka	1,205	695	1.7	1,529	607	2.5	2,784	1,413	2.0
Juneau-Douglas ²	184	118	1.6	222	103	2.2	211	90	2.3
Petersburg	254	169	1.5	177	99	1.8	357	213	1.7
Ketchikan ²	214	36	5.9	342	137	2.5	115	65	1.8
Other Southeast									
Subsistence ³	49	37	1.3	23	0	0	126	46	2.7
Other Nonsubsistence	68	4	17.0	48	19	2.5	117	65	1.8
Total	2,050	1,128	1.8	2,341	965	2.4	3,818	1,987	1.9

SOURCE: SEIS PLanning Record.

¹ The location of Major Harvest Area 33 is shown in Figure 3-2.

² Ketchikan and Juneau - Douglas are not subsistence communities.

³ Other Southeast Alaska subsistence communities that harvest deer in Major Harvest Area 33 may include Elfin Cove, Gustavus, Haines, Hoonah, Kake, Klukwan, Pelican, Tenakee Springs, and Wrangell.

Table 3-31

Deer Hunter Days, Harvest, and Average Number of Hunter Days to Harvest in Major Harvest Area 36, 1985-1987¹

	1985			1986			1987		
	<i>Hunter Days</i>	<i>Deer Harvest</i>	<i>Avg. Days</i>	<i>Hunter Days</i>	<i>Deer Harvest</i>	<i>Avg. Days</i>	<i>Hunter Days</i>	<i>Deer Harvest</i>	<i>Avg. Days</i>
Hoonah	75	82	0.9	103	21	0	501	138	3.6
Juneau-Douglas ²	878	361	2.4	1,902	694	2.7	2,496	752	3.3
Ketchikan ²	358	149	2.4	520	87	6.0	310	116	2.7
Petersburg	0	0	0.0	145	34	4.3	41	5	8.2
Other Southeast									
Subsistence ³	215	144	1.5	231	99	2.3	337	276	1.2
Other Nonsubsistence	48	20	2.4	13	0	0	18	9	2.0
Total	1,574	1,117	1.4	2,914	935	3.1	3,703	1,296	2.9

SOURCE: SEIS Planning Record.

¹ The location of Major Harvest Area 36 is shown in Figure 3-2.

² Ketchikan and Juneau - Douglas are not subsistence communities.

³ Other Southeast Alaska subsistence communities that harvest deer in Major Harvest Area 36 may include Elfin Cove, Gustavus, Haines, Hoonah, Kake, Klukwan, Pelican, Tenakee Springs, and Wrangell.

Chapter 4

Environmental Consequences



Chapter 4

Environmental Consequences

Chapter 4 provides the scientific and analytic basis for comparing the environmental effects of the alternatives described in Chapter 2, Alternatives Including the Proposed Action. The evaluation of the alternatives, including their relationship to the issues introduced in Chapter 1, is the focus of Chapter 4.

Chapter 4 is presented in four sections. The first is an evaluation of the resource categories described in Chapter 3, (i.e., soils, vegetation, wildlife, etc.). Within each resource category certain impacts are common to all alternatives. These impacts are evaluated together. Then the effects of each alternative on that resource category are evaluated. These site-specific consequences are discussed in terms of effects of actions through 1990. Management options on private lands are not a part of the proposed alternatives. Certain assumptions are made concerning the management of these lands in order to analyze and project possible environmental consequences resulting from all ownerships within the analysis area.

Young Trees on Past Timber Harvest Units Above Sitkoh Lake



The second part of Chapter 4 is titled Reasonably Foreseeable, Long-Term, and Cumulative Effects. The reasonably foreseeable, long-term impacts for the SEIS alternatives are presented as well as the effects of adjacent harvest, past harvest, and harvest anticipated through the life of the APC Contract (year 2011). The assumptions used in these long-term projections are displayed at the beginning of this second part of Chapter 4.

The third section of Chapter 4 includes Other Environmental Considerations that must be addressed under NEPA but do not fall under the environmental resource categories discussed in Chapter 3. These topics include unavoidable adverse environmental effects, the relationship between short-term use and the maintenance and enhancement of long-term productivity; the irreversible and irretrievable commitment of resources; possible conflicts between alternatives and other land uses; energy requirements; and natural, depletable resource requirements.

The fourth part of Chapter 4 discusses mitigation measures. It reviews those measures already adopted to avoid or reduce impacts, including the standards and guidelines in use by policy. It then summarizes the site-specific and impact-specific mitigation measures that will be applied.

Resource Categories

Soils

Certain management activities can increase the frequency and magnitude of soil erosion. Road construction produces the greatest opportunity for chronic soil loss and sedimentation. About 90 percent of this soil loss occurs during the first three years after construction. The rate of soil loss then decreases as vegetative cover is reestablished on slopes and as less soil is available to erode.

Landslides can be triggered by removing vegetation or by altering mechanical support (e.g., making cutbanks along road alignments). The chance of stream-caused erosion increases when braided stream channels are logged or crossed with roads.

In Analysis Area 6, all soil areas classified as having an extreme hazard of mass wasting were eliminated from consideration when developing road systems and harvest units. Therefore, there are no roads or harvest units proposed on areas of extreme soil hazard in any of the alternatives. This greatly reduces the potential to negatively impact long-term soil productivity. All the proposed action alternatives will have a similar, minor effect on soils.

There remains a potential for landslides and surface erosion on areas classified as having a moderate or moderately high soil hazard. These areas, however, can be managed without measurable increases in chronic soil erosion by careful application of project standards and guidelines and timely application of the erosion control provisions of the Timber Sale Contract.

Standards and guidelines frequently include modifications to the harvest system such as split line or full suspension yarding. These measures are identified on the Unit Cards which are displayed in Appendix A-1. Contractual provisions that are employed to protect the soil resource include revegetation (grass seeding and fertilizing) of all cut and fill slopes, landings, and other yarding disturbances, as well as installing water bars on all temporary roads.

Although the above measures are expected to effectively protect against any significant effects on soils, there is a possibility that management activities may contribute to the risk of soil movement. Because of this it is useful to look at the acres of soil disturbance within various soil hazard rating areas as a means of comparing alternatives. Table 4-1 summarizes this information. Although the risk to soils are similar among the alternatives, the risk under Alternative 3 is slightly higher, and under Alternative 2 slightly lower. The potential impact each alternative has on soil productivity is related to the total acres harvested and miles of road built. However, the effects will vary widely from location to location, depending on such factors as the kind of yarding system employed (which bears directly on the amount of soil dis-

Table 4-1

Timber Harvest by Soil Hazard Class (Acres)

	VCU	Low/ Medium	High	Total
<i>Alternative 2</i>	236	256	334	590
	239	151	198	349
	242	131	240	371
	243	623	539	1,162
	Total	1,161	1,311	2,472
	Percent	46	54	
<i>Alternative 3</i>	236	256	334	590
	238	862	289	1,151
	239	151	198	349
	242	131	240	371
	243	488	140	628
	Total	1,888	1,201	3,089
<i>Alternative 4</i>	Percent	61	39	
	236	128	0	128
	237	384	20	404
	238	862	289	1,151
	239	20	128	148
	242	131	240	371
<i>Alternative 5</i>	243	488	354	842
	Total	2,013	1,031	3,044
	Percent	66	34	
	235	540	472	1,012
	236	128	0	128
	237	384	20	404
<i>Alternative 5</i>	238	862	289	1,151
	239	145	128	273
	240	0	140	140
	241	503	5	508
	242	481	87	568
	243	145	249	394
<i>Alternative 5</i>	244	379	92	471
	Total	3,567	1,482	5,049
	Percent	70	30	

(Continued)

Table 4-1(Continued)

Timber Harvest by Soil Hazard Class (Acres)

	VCU	Low/ Medium	High	Total
<i>Alternative 6</i>	235	365	342	707
	236	128	0	128
	237	384	20	404
	238	862	289	1,151
	239	20	128	148
	243	315	539	854
	Total	2,074	1,318	3,392
	Percent	61	39	
<i>Alternative 7</i>	235	107	304	411
	236	204	171	375
	237	353	0	353
	238	549	183	732
	239	256	288	544
	242	131	240	371
	243	230	200	430
	244	80	190	270
	245	20	57	77
	Total	1,930	1,633	3,563
	Percent	54	46	

SOURCE: SEIS Planning Record

turbance) and soil type. Logging reduces soil productivity in areas used for roads, landings, skid trails, skyline corridors, and borrow sites. Those areas generally amount to between 5 and 10 percent of most harvest units.

Vegetation

Although all of the alternatives would affect the same vegetation types similarly, the extent and magnitude of their effects would be proportional to the acres of land disturbed in the analysis area. The proposed harvest under the action alternatives ranges between 2,158 acres for Alternative 2 and 4,761 acres under Alternative 5. Because Alternative 5 proposes to harvest over twice the acreage of Alternative 2, its effect on vegetation would be twice that of Alternative 2. The extent of the effects on vegetation, however, would be minimal as indicated in Table 4-2. The cumulative percent of the land base harvested would range between 9.8 for Alternative 2 to 11.3 for Alternative 5, only 1.5 percent difference. Alternative 1, the No Action-Current Direction Alternative, would result in harvest of 8.5 percent of the total land base of Analysis Area 6, only 2.8 percent less than Alternative 5.

The short-term effect on vegetation for each of the action alternatives would be the conversion of climax forest stands into young, successional stands. The removal of the forest overstory would change the microsite conditions that had influenced the species composition and density of the understory vegetation. Species that thrive best in the shaded and protected envi-

ronment under the mature forest, such as some mosses, liverworts, lichens, herbs, and shrubs, would find themselves without the beneficial influence of the trees, and would be reduced in vigor or competitive ability. Some species survive in the understory, but when released from the influence of the forest, become vigorous competitors for growth space. Examples are huckleberries and western hemlock trees. Other species are not notable in the forest understory (including some trees, such as Sitka spruce), but are able to develop rapidly from seed in open conditions.

The successional changes which occur in the forest after harvest are described in the Long-Term section of this chapter, under Vegetation/Timber. Because some sites are more productive than others, they are rated by a site index and are assigned a site class of low, medium, or high. The site index is based on the expected height to which a tree will grow on that site in a given number of years (in this case, 100 years). For example, on a "low" site, trees would be expected to grow between 50 and 70 feet in 100 years. The proposed harvest by site class for all alternatives in Analysis Area 6 is shown in Table 4-3.

Timber

The action alternatives, which propose timber harvest and road construction, could effect the productivity of the land for further timber production. Like the impacts of the alternatives on vegetation, the extent of the impact on timber production is proportional to the amount of land disturbed. The magnitude of the disturbance, however, may be affected by the logging methods and silvicultural prescriptions proposed. Because of the stringent standards and guidelines applied to timber management activities in the Tongass National Forest, the magnitude of the effects of the action alternatives is considered minor.

Section 4, pages 4-1 through 4-12 of the "1986-90 Operating Period for the Alaska Pulp Corporation Long-Term Sale Area FEIS" (1986-90 FEIS) (Forest Service 1986b) has a detailed discussion about the environmental consequences on commercial forest land resulting from the removal of stands of timber from the APC Contract area. This section supplements that section of the 1986-90 FEIS. Below is a summary of the acreage and percent of CFL acreage and operable CFL acreage proposed for harvest under each alternative. Following are discussions of the effects of timber harvest methods, regeneration, and precommercial thinning on the productivity of commercial forest land. The effects of timber harvest on mature and over-mature stands is considered long term and is discussed below under reasonably foreseeable, long-term, and cumulative effects.

Tables 2-1 through 2-7 present the acres and volumes proposed for harvest under the alternatives. Table 4-2 shows the cumulative harvest that would result under the alternatives as well as the percent cumulative operable CFL and cumulative CFL that would result. These percent-

Table 4-2
Effects of Harvest on Land Base, CFL, Operable CFL, and Normal Operable CFL

	Alternative						
	1	2	3	4	5	6	7
Cumulative Harvest Acres	14,790	16,995	17,559	17,531	19,536	17,901	18,002
Percent Normal Operable CFL	21.2	24.8	25.7	25.6	28.5	26.1	26.2
Percent Operable CFL	16.1	18.8	19.5	19.4	21.6	19.8	19.8
Percent CFL	15.0	17.6	18.2	18.1	20.2	18.4	18.6
Percent Land Base	8.5	10.0	10.3	10.3	11.3	10.4	10.5

SOURCE: Tongass Land Management Plan aerial photo points inventory, Forest Service Region 10, Juneau, AK.

Table 4-3

Proposed Timber Harvest by Site Class (Acres)

	VCU	Low	Site Class ¹ Medium	High
<i>Alternative 2</i>	236	138	148	304
	239	0	76	273
	242	0	0	371
	243	75	678	409
<i>Alternative 3</i>	236	138	148	304
	238	0	243	855
	239	0	76	273
	242	0	0	371
	243	75	553	0
<i>Alternative 4</i>	236	0	0	128
	237	0	155	266
	238	0	243	855
	239	0	0	148
	242	0	0	371
	243	75	668	99
<i>Alternative 5</i>	235	0	0	1,012
	236	0	0	128
	237	0	155	266
	238	0	243	855
	239	0	76	273
	240	0	0	140
	241	0	25	483
	242	0	197	371
	243	45	85	264
	244	87	207	177
<i>Alternative 6</i>	235	0	200	562
	236	0	0	128
	237	0	155	266
	238	0	243	855
	239	0	0	148
	243	40	512	464

(Continued)

Table 4-3 (Continued)

Proposed Timber Harvest by Site Class (Acres)

	VCU	<i>Low</i>	Site Class ¹ <i>Medium</i>	<i>High</i>
<i>Alternative 7</i>	235	0	.149	252
	236	50	76	249
	237	0	185	151
	238	0	161	571
	239	60	128	208
	242	0	0	371
	243	35	395	0
	244	15	155	100
	245	0	77	0

SOURCE: SEIS Planning Record

¹ Site Index: Low = Average tree height 50 - 70 feet at 100 years; Medium = Average tree height 70 - 89 feet at 100 years; Low = Average tree height 90+ feet at 100 years.

*Rigging Slinger Sets a
Tailhold for the Yarder*



tages indicate the relative extent of effects that would result from the harvest proposed under the alternatives. Although Alternative 5 would harvest more than double the acres and volume of Alternative 2, the extent of its impact is minimal when all the alternatives are compared. The percentage of operable CFL and CFL affected by the alternatives differs by only about 5 percent.

Yarding is the process of conveying logs with a cable logging system to a landing. A standard and common method is the highlead cable system. This system is capable of yarding up to 1,200 feet slope distance. Skyline logging includes several yarding techniques. The Grabinski system is a modification of highlead in common use in the Chatham Area. This system can reach distances approaching 2,000 feet. Long span skylines are used on large tower yarders and can log spans between 2,000 and 3,000 feet. Another skyline method called running skyline is used on small mobile yarders. Running skylines have distance capability of up to 1,600 feet.

Moist and soft soils in the Chatham Area are difficult for operation of ground-based equipment and there has been little opportunity for use of these machines except for shovel logging with track-mounted log loaders. Shovel logging is the process of moving logs with the boom of a hydraulic log loader. The object is to use the swing motion of the loader to swing logs into windrows, then swing the windrows to new locations ultimately to a road or landing. The APC 1981-86 FEIS concludes that logging operations will create an estimated 5 to 10 percent of bare mineral soil which will be more erosive than undisturbed sites (Forest Service 1980a, p. 53).

The different logging systems used in the Chatham Area have different effects on the ground. The logs yarded by the highlead system are generally dragged on the ground. Some lift to one end of the log is provided by the 90-foot towers commonly used with this method. Where highlead is done uphill the drag corridors radiate down and away from the landing. Water moving down the slope is dispersed into the cut unit. Where highlead is done down slope, water tends to congregate as drag corridors converge at the landings.

During yarding, skyline logging methods and the Grabinski system are able to provide lift to one end of the logs or complete suspension of the log. Impact of log movement with these systems is much reduced when compared to highlead. Corridor convergence or divergence as discussed with the highlead system is similar with the skyline skid corridors.

The effect of shovel logging is related to compaction of the soil under the track system through loss of flotation and resulting sinkage into the soil. The impact on the soil depends on the soil and moisture condition of the soil. The area covered by shovel logging will be less impacted over that caused by cable methods in the case where the cable system is prone to rutting by log passage. Since logs are lifted slowly, picked up and laid down again, no rutting occurs. Where the machine moves over slash or deep organic accumulations, compaction may not be a factor. Shovel logging results in problems in poorly drained soils or soils with organic parent materials.

The Forest Service is required by law, regulation, and policy to plan harvest of timber only where there is assurance that such land can be regenerated within five years after harvest is completed. Current management prescriptions for harvest units in Analysis Area 6 specify natural regeneration to restock most clearcut-harvested stands. Artificial regeneration by hand planting would serve as the back up method for stands that cannot be certified as adequately regenerated within five years. Burning may be used to prepare sites for natural regeneration establishment. Some areas may also be broadcast burned if management direction and silvicultural prescriptions indicate a need to reduce fuel concentrations. Burning also shows some promise as a measure to improve the wildlife habitat of a second-growth stand where logging debris is an impediment.

In Southeast Alaska, 50 years of experience has demonstrated clearcutting to be a successful and the most cost-effective method of facilitating natural regeneration of commercial forest

species. Although the term clearcut appears to contradict the regeneration concept, this is not the case in the Southeast Alaska spruce/hemlock forest ecosystem where clearcutting results in prolific tree production. Tree production in such exposed areas can be so heavy that pre-commercial thinning is required to reduce stand stocking levels to less than 200 stems per acre. Shallow soils and severe weather conditions have resulted in windthrow where selection and shelterwood harvest systems have been attempted.

Precommercial thinning would be prescribed in some areas under each of the action alternatives. There are many advantages to reducing natural conifer stocking levels from 3,000 trees per acre by precommercial thinning. Short-term benefits include employment and increased, higher quality habitat for some wildlife species than would be provided in unthinned second-growth stands. Long-term benefits are primarily centered around reducing the competition for sunlight by the plant community. This results in the understory and the remaining conifers growing at accelerated rates for longer time periods than unthinned second-growth stands. This translates into higher forage values to wildlife, higher sawlog volume, and faster successional change, thus providing climax stand conditions sooner than would be provided by unthinned second-growth stands.

Wildlife

Information from the Affected Environment Section (Chapter 3) provides the basis to evaluate impacts on the various wildlife species and habitats. The analysis of impacts focuses on the emphasis species and emphasis habitats discussed in Chapter 3. The analysis provided below considers the alternatives along with general and site-specific differences and similarities among them. It also considers both the impacts of the alternatives and the combined impacts of all past timber harvest in Analysis Area 6. Effects on wildlife habitats are discussed first, followed by a discussion of the effects on the wildlife species.

Wildlife Habitats

Timber harvest activities proposed in all the action alternatives would generally result in the loss of existing wildlife habitat values. In those affected habitats, most or all immobile species and life stages, or species with small home ranges could be directly lost. Resident and migratory species dependent upon those habitats would be forced to relocate to adjacent areas. Those displaced animals would increase the competition for food and cover in the remaining habitats. Where the population of a wildlife species is near the carrying capacity of the habitat, the population would be reduced to the number the remaining habitat could support or to a lower number if the increased competition caused degradation of the habitat.

All of the alternatives, except the no action, include harvest of some additional wildlife habitat. Many of the harvest units are common to several or all the action alternatives, and the effects of the alternatives on wildlife habitat are also similar. The location of the impacts shifts somewhat around the analysis area as the harvest units unique to the alternatives are added and subtracted. For example, Alternative 5 affects more deer winter range (primarily in VCU 243) than the other alternatives.

Acres of forested habitat that would be altered by harvest in each alternative are presented in Table 4-4. The amount varies from 0 to 1,160 acres in separate VCUs. Forested habitat includes all acres of commercial forest land. The other emphasis habitats are also included within the larger category of forested habitat. For forested habitat, the percent remaining at the end of the timber harvest approved through December 31, 1990 would range from 67 percent in VCU 236 for Alternatives 2 and 3 to 100 percent in VCUs 237, 238, and 240 for one or more of the alternatives (Table 4-5).

The changes in emphasis habitats for each alternative are discussed below. The data on acres affected and acres remaining are derived from planning records for the Tongass Land Management Plan (TLMP), the 1986-90 FEIS, and ongoing planning records in the Chatham Area Office. The tables that show acres of wildlife habitats remaining account for all timber harvest authorized or proposed through December 31, 1990.

4 Environmental Consequences

Table 4-4

Forested Habitat Affected by Alternative

VCU	1	2	3	4	5	6	7
<i>Acres Affected</i>							
235	0	0	0	0	1,012	762	401
236	128	590	590	128	128	128	375
237	0	0	0	421	421	421	319
238	0	0	1,098	1,098	1,098	1,098	732
239	148	349	349	148	273	148	508
240	0	0	0	0	140	0	0
241	0	0	0	0	508	0	0
242	0	371	371	371	568	0	367
243	0	1,162	628	842	394	826	430
244	0	0	0	45	471	0	270
245	0	0	0	0	0	0	77
Total	276	2,472	3,036	3,008	5,013	3,383	3,479
<i>Percent Affected</i>							
235	0	0	0	0	4	3	1
236	1	3	7	0	1	0	3
237	0	0	0	10	9	9	7
238	0	0	17	17	17	17	12
239	2	3	3	2	2	1	4
240	0	0	0	0	2	0	0
241	0	0	0	0	10	0	0
242	0	4	4	4	7	0	4
243	0	6	3	4	2	5	2
244	0	0	0	— ¹	5	0	3
245	0	0	0	0	0	0	1
Total ²	0	2	2	2	3	2	2

SOURCE: SEIS Planning Record.

¹ Affected amount is less than one percent.

² This value represents the percent of pre-harvest habitat affected in the entire analysis area.

Table 4-5
Forested Habitat Remaining by Alternative¹

VCU	1	2	3	4	5	6	7
<i>Acres Remaining</i>							
235	26,720	26,720	26,720	26,720	25,708	25,958	26,319
236	6,112	5,650	5,650	6,112	6,112	6,112	5,865
237	4,590	4,590	4,590	4,169	4,169	4,169	4,271
238	6,360	6,360	5,262	5,262	5,262	5,262	5,628
239	9,815	9,614	9,614	9,815	9,690	9,815	9,455
240	7,003	7,003	7,003	7,003	6,863	7,003	7,003
241	4,890	4,890	4,890	4,890	4,382	4,890	4,890
242	7,264	6,893	6,893	6,893	6,696	7,264	6,897
243	16,678	15,516	16,050	15,836	16,284	15,852	16,248
244	8,116	8,116	8,116	8,071	7,645	8,116	7,846
245	15,464	15,464	15,464	15,464	15,464	15,464	15,387
Total	113,015	110,816	110,252	110,280	108,275	109,715	109,743
<i>Percent Remaining</i>							
235	98	98	98	98	94	96	97
236	71	65	65	71	71	71	69
237	100	100	100	91	91	91	93
238	100	100	83	83	83	83	88
239	78	76	76	78	77	78	75
240	100	100	100	100	98	100	100
241	87	87	87	87	77	87	87
242	86	81	81	81	79	86	81
243	85	79	82	81	83	80	83
244	79	79	79	78	74	79	76
245	79	79	79	79	79	79	79
Total ²	87	86	85	85	84	85	85

Source: SEIS Planning Record.

¹ Includes all harvest plans through the 1990 harvest season.

² This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

The information presented in the tables is a summary of the data available on the Unit Cards which are reproduced in Appendix A-1. The Unit Cards list the acres of specific habitat type that would be affected by each harvest unit and associated roads. The units can also be located on the Alternative Maps included in this SEIS. The Unit Cards also list specific mitigation measures that would be applied to those units.

Deer Winter Range

Acres of deer winter range that would be harvested by each alternative are presented in Table 4-6. The amount ranges from 0 in many VCUs to 155 acres in VCU 236 with Alternatives 2, 3, and 7. The percent reduction within a given VCU ranges from 0 to 28 percent with the different alternatives. The greatest amount of deer winter range would be altered by harvest with Alternative 5 and the least with Alternatives 1, 4, 5, and 6 (0 acres).

Deer winter range remaining following timber harvest (Table 4-7) would range from 100 percent for most of the alternatives in VCUs 237, 238, 240, and 244 to 31 percent for Alternative 5 in VCU 241. The amount of winter range remaining would be similar for all alternatives and range between approximately 15,898 acres and 16,256 acres. Capability of this habitat to produce deer is discussed in the section on the results from the deer model.

Inland Wetland

None of these habitats would be altered by harvest in any of the current alternatives.

The percent of inland wetland habitat remaining would range from 60 percent in VCU 235 to 100 percent in VCUs 240, 241, and 245. There are no differences between the alternatives as none propose to alter inland wetland habitat.

Table 4-6

Deer Winter Range Habitat Affected by Alternative

VCU	1	2	3	4	5	6	7
<i>Acres Affected</i>							
235	0	0	0	0	0	0	82
236	0	155	155	0	0	0	155
240	0	0	0	0	45	0	0
241	0	0	0	0	122	0	0
242	0	0	0	0	56	0	0
243	0	0	0	0	135	0	65
Total	0	155	155	0	358	0	302
<i>Percent Affected</i>							
235	0	0	0	0	0	0	3
236	0	9	9	0	0	0	9
240	0	0	0	0	28	0	0
241	0	0	0	0	12	0	0
242	0	0	0	0	3	0	0
243	0	0	0	0	4	0	2
Total ¹	0	1	1	0	2	0	1

SOURCE: SEIS Planning Record.

¹ This value represents the percent of pre-harvest habitat affected in the entire analysis area.

Table 4-7
Deer Winter Range Habitat Remaining by Alternative¹

VCU	1	2	3	4	5	6	7
<i>Acres Remaining</i>							
235	3,089	3,089	3,089	3,089	3,089	3,089	3,007
236	1,595	1,440	1,440	1,595	1,595	1,595	1,440
237	1,301	1,301	1,301	1,301	1,301	1,301	1,301
238	1,120	1,120	1,120	1,120	1,120	1,120	1,120
239	1,451	1,451	1,451	1,451	1,451	1,451	1,451
240	160	160	160	160	115	160	160
241	440	440	440	440	318	440	440
242	1,670	1,670	1,670	1,670	1,614	1,670	1,670
243	2,185	2,185	2,185	2,185	2,050	2,185	2,120
244	70	70	70	70	70	70	70
245	3,175	3,175	3,175	3,175	3,175	3,175	3,175
Total	16,256	16,101	16,101	16,256	15,898	16,256	15,954
<i>Percent Remaining</i>							
235	98	98	98	98	98	98	95
236	96	86	86	96	96	96	86
237	100	100	100	100	100	100	100
238	100	100	100	100	100	100	100
239	76	76	76	76	76	76	76
240	100	100	100	100	72	100	100
241	44	44	44	44	31	44	44
242	87	87	87	87	84	87	87
243	65	65	65	65	61	65	64
244	100	100	100	100	100	100	100
245	70	70	70	70	70	70	70
Total ²	81	80	80	81	79	81	79

SOURCE: SEIS Planning Record.

¹ Includes all harvest plans through the 1990 harvest season.

² This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

4 Environmental Consequences

Beach Fringe and Estuarine Habitats



Beach Fringe

Acres of beach fringe habitat that would be altered by harvest in each alternative is presented in Table 4-8. The amount affected ranges from 0 acres for most VCUs to 180 acres for VCU 242 in Alternative 5. The percent of original beach fringe habitat remaining would range from 47 percent for VCU 243 in Alternative 5 to 100 percent for VCUs 235, 237, 238, 240, and 244 for most of the alternatives (Table 4-9).

Table 4-8

Beach Fringe Habitat Affected by Alternative

VCU	1	2	3	4	5	6	7
<i>Acres Affected</i>							
240	0	0	0	0	40	0	0
241	0	0	0	0	13	0	0
242	0	0	0	0	180	0	0
243	0	21	0	0	54	42	0
Total	0	21	0	0	287	42	0
<i>Percent Affected</i>							
240	0	0	0	0	34	0	0
241	0	0	0	0	4	0	0
242	0	0	0	0	42	0	0
243	0	3	0	0	8	5	0
Total ¹	0	— ²	0	0	5	1	0

Source: SEIS Planning Record.

¹ This value represents the percent of pre-harvest habitat affected in the entire analysis area.

² Affected amount is less than one percent.

Table 4-9
Beach Fringe Habitat Remaining by Alternative¹

VCU	1	2	3	4	5	6	7
<i>Acres Remaining</i>							
235	455	455	455	455	455	455	455
236	218	218	218	218	218	218	218
237	549	549	549	549	549	549	549
238	345	345	345	345	345	345	345
239	565	565	565	565	565	565	565
240	116	116	116	116	76	116	116
241	200	200	200	200	187	200	200
242	407	407	407	407	227	407	407
243	389	368	389	389	335	347	389
244	36	36	36	36	36	36	36
245	1,353	1,353	1,353	1,353	1,353	1,353	1,353
Total	4,633	4,612	4,633	4,633	4,346	4,591	4,633
<i>Percent Remaining</i>							
235	100	100	100	100	100	100	100
236	71	71	71	71	71	71	71
237	100	100	100	100	100	100	100
238	100	100	100	100	100	100	100
239	94	94	94	94	94	94	94
240	100	100	100	100	66	100	100
241	56	56	56	56	53	56	56
242	96	96	96	96	53	96	96
243	54	51	54	54	47	48	54
244	100	100	100	100	100	100	100
245	76	76	76	76	76	76	76
Total ²	81	81	81	81	76	81	81

SOURCE: SEIS Planning Record.

¹ Includes all harvest plans through the 1990 harvest season.

² This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

Estuarine Fringe

None of these habitats would be altered by harvest in any of the current alternatives.

The percent of original estuarine fringe habitat remaining would range from 30 percent in VCUs 239 and 245 to 100 percent in four VCUs. There are no differences between the alternatives as none propose to alter estuarine fringe habitat.

Streamside Riparian

Acres of streamside riparian habitat that would be altered by harvest for each alternative are shown in Table 4-10. The amount ranges from 0 acres in many VCUs to 90 acres in VCU 238 with Alternatives 3 through 6. The affected amount ranges from 0 to 38 percent. VCU 237 where 38 percent is projected is a research area in which the cutting units have been designed to facilitate measuring of large harvest percentages.

The percent of original streamside riparian habitat remaining would range from 25 percent in VCU 245 for all alternatives to 100 percent in VCUs 237, 238, and 240 for several of the alternatives (Table 4-11). The amount remaining would range from 5,926 acres for Alternative 5 to 6,387 acres for Alternatives 1, and 2.

Old-Growth Conditions

The 1986-90 FEIS identified some forest areas that were prescribed as old-growth habitat conditions. Table 4-12 shows the amount of prescribed old-growth habitat conditions and the proposed timber harvest alternatives. The No Action Alternative and Alternative 4 do not propose additional harvest within this habitat. Alternative 5 would have the greatest effect on prescribed old-growth conditions. Approximately 990 acres are proposed for timber harvest under this alternative.

Table 4-10

Streamside Riparian Habitat Affected by Alternative

VCU	1	2	3	4	5	6	7
<i>Acres Affected</i>							
235	0	0	0	0	71	0	20
237	0	0	0	45	45	45	35
238	0	0	90	90	90	90	0
241	0	0	0	0	10	0	0
244	0	0	0	0	5	0	0
Total	0	0	90	135	150	135	55
<i>Percent Affected</i>							
235	0	0	0	0	4	0	2
237	0	0	0	38	38	38	29
238	0	0	12	12	12	12	0
241	0	0	0	0	3	0	0
244	0	0	0	0	1	0	0
Total ¹	0	0	1	2	2	2	2

SOURCE: SEIS Planning Record.

¹ This value represents the percent of pre-harvest habitat affected in the entire analysis area.

Table 4-11
Streamside Riparian Habitat Remaining by Alternative¹

VCU	1	2	3	4	5	6	7
<i>Acres Remaining</i>							
235	1,921	1,921	1,921	1,921	1,850	1,921	1,921
236	180	180	180	180	180	180	180
237	120	120	120	62	62	62	120
238	726	726	409	409	409	409	726
239	387	387	387	387	387	387	387
240	1,090	1,090	1,090	1,090	1,090	1,090	1,090
241	485	485	485	485	475	485	485
242	297	297	297	297	297	297	297
243	321	321	321	321	321	321	321
244	590	590	590	590	585	590	590
245	270	270	270	270	270	270	270
Total	6,387	6,387	6,070	6,012	5,926	6,012	6,387
<i>Percent Remaining</i>							
235	99	99	99	99	95	99	99
236	52	52	52	52	52	52	52
237	100	100	100	52	52	52	100
238	100	100	56	56	56	56	100
239	64	64	64	64	64	64	64
240	100	100	100	100	100	100	100
241	99	99	99	99	97	99	99
242	97	97	97	97	97	97	97
243	55	55	55	55	55	55	55
244	67	67	67	67	67	67	67
245	25	25	25	25	25	25	25
Total ²	78	78	74	73	73	73	78

Source: SEIS Planning Record.

¹ Includes all harvest plans through the 1990 harvest season.

² This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

4 Environmental Consequences

It is important to note that if all proposed timber harvest in any action alternative were implemented, approximately 89 percent of the existing prescribed old-growth habitat conditions would still remain. Additional habitat of equivalent quality also exists in areas where no old-growth conditions were prescribed. The 1986-90 FEIS did not evaluate all of the VCUs within Analysis Area 6 for purposes of prescribing old-growth habitat conditions. VCUs 240, 241, 244, and 245, as shown on the 1986-90 maps, contain no such prescription.

Old Growth and Streamside Riparian Habitats



Table 4-12

Old-Growth Habitat Affected by Alternative in Acres

VCU ¹	Old-Growth Conditions ²	1	2	3	4	5	6	7
235	2,570	0	0	0	0	609	0	304
236	944	0	183	188	0	0	0	0
237	1,495	0	0	0	0	0	0	0
238	584	0	0	0	0	0	0	0
239	1,439	0	0	0	0	0	0	0
242	1,121	0	0	0	0	228	0	0
243	1,318	0	134	0	0	153	179	0
Total	9,471	0	317	188	0	990	179	304

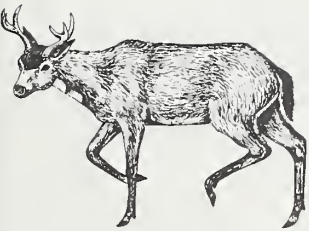
SOURCE: SEIS Planning Record.

¹ Information for other VCUs is not available.

² Habitat acres prescribed in the 1986-90 FEIS (Forest Service 1986b).

Emphasis Species

The changes to wildlife habitats discussed above would have an effect on the wildlife that use those habitats. Emphasis species have been selected to identify those effects and allow some comparison to how the other wildlife may be affected. In addition to a discussion of timber harvest impacts resulting from the alternatives, information is provided below concerning deer and pine marten habitat capability.



Sitka Black-tailed Deer

Black-tailed Deer

The Sitka black-tailed deer utilizes all habitats within Analysis Area 6. The quality of habitats in close proximity to the shoreline is believed to be the most critical factor limiting survival of the black-tailed deer during severe winters. Timber harvest in this habitat could affect deer population numbers during severe winters, at least until suitable vegetation is re-established.

The proposed timber harvest alternatives would have approximately the same effect on all wildlife habitats, except of Alternative 5, which proposes the harvest of approximately 990 acres of prescribed old-growth habitat and 287 acres of beach fringe habitat. Although this habitat is important to black-tailed deer and old-growth dependent species, the harvest proposed represents 10 percent of the existing prescribed old-growth in the entire Analysis Area. The other alternatives propose between 188 and 317 acres of old-growth harvest with none proposed in Alternative 4.

A deer habitat capability model was used to estimate potential effects of management activities on deer numbers. The model, which is described in Consolidated Appendix, Volume III, E evaluates factors such as vegetative species, volume class, successional stage, slope, aspect, and elevation as a means of predicting potential effects on deer herds. Information on the use of this simplistic model and the data used in the model is provided in Consolidated Appendix, Volume II, C-3: Theme Response 9 regarding data adequacy and models used.

The habitat capability model information projects less than a 4 percent reduction in deer numbers may be expected from the proposed timber harvest alternatives (Table 4-13). In some alternatives the potential reduction approaches close to 1 percent. This potential reduction represents a range of 45 to 160 animals in a potential existing population of 4,050 (Table 4-14).

The discussion in Chapter 3 indicated ADF&G has produced a document that recommends no greater than 10 percent of the existing deer population should be harvested annually. These guidelines were developed through the use of computer model simulation, evaluation of deer harvest data and research into the specific habitat needs of the black-tailed deer. As noted in Chapter 3, Minor Harvest Area 3627 reported 1988 deer harvest levels above the amount needed to sustain the population. Further evaluation of the data also indicated that current deer harvest levels in this Minor Harvest Area exceeded the habitat capability estimates in 1961 prior to any APC timber harvest activities.

Timber harvest proposed in Minor Harvest Areas 3627, 3628, and 3308 would result in additional deer number reductions. Alternative 6 proposes timber harvest that would result in additional habitat capability losses and would include 47 deer in Minor Harvest Area 3627, 47 deer in Minor Harvest Area 3628, and 65 deer in Minor Harvest Area 3308.

Brown Bear

The brown bear utilizes forested, beach fringe and streamside riparian habitats within Analysis Area 6. Over 84 percent of the original forested habitat would remain following proposed timber harvest in all the alternatives. In addition over 78 percent of beach fringe and streamside riparian habitats would remain in Alternatives 1, 2, and 7. Timber harvest activity proposed within those habitats should result in no major effects on the brown bear population for those alternatives. The greatest impacts would occur with Alternative 5. Eighty four percent of the forested habitat, 76 percent of beach fringe, and 73 percent of streamside riparian would remain with Alternative 5.



Brown Bear

4 Environmental Consequences

The brown bear model used to estimate habitat capability numbers, considers human population numbers and their proximity to the habitat, the method of garbage disposal (open garbage dumps or incineration), habitat effects due to timber harvest, and road density. Of all the factors considered, road density (both existing and new construction) and access to brown bear habitat has the greatest potential for reducing bear numbers. This is due to the improved access for hunters and the incidental human-bear contact which sometimes results in "defense of life or property" kills.

The habitat capability model information indicates less than a 17 percent reduction in brown bear numbers may be expected from the proposed timber harvest alternatives (Table 4-15). In Alternative 2, the potential reduction is approximately 1 percent. This potential reduction represents approximately 2 to 35 animals in a potential existing population of 130 (Table 4-16).

Table 4-13

Projected Percent Reduction of Potential Sitka Black-tailed Deer Numbers Based on a Habitat Capability Model

VCU	Previous Change ¹	Alternative						
		1	2	3	4	5	6	7
Minor Harvest Area 3627								
236	16.9	0	3.1	3.1	0	0	0	1.4
237	0	0	0	7.6	8.1	7.6	8.1	5.9
238	0	0	0	11.5	11.5	11.9	11.5	7.0
Subtotal ²	7.2	0	1.3	6.8	5.6	5.6	5.6	4.3
Minor Harvest Area 3628								
235	0.8	0	0	0	0	4.8	3.2	1.0
Minor Harvest Area 3308								
239	17.6	0	1.6	1.6	0	1.0	0	2.8
240	0	0	0	0	0	4.3	0	0
241	16.5	0	0	0	0	9.9	0	0
242	13.5	0	1.8	1.8	1.8	3.6	0	1.8
243	19.8	0	3.5	2.2	2.7	1.4	2.7	1.9
244	31.1	0	0	0	0.3	4.0	0	1.0
245	22.3	0	0	0	0	0	0	0.4
Subtotal ²	19.1	0	1.2	0.9	0.8	2.3	0.6	1.2
Total ³	13.2	0	1.0	1.8	1.5	3.4	2.0	1.7

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See also Consolidated Appendix, Volume II, C-3; Theme Response 9 regarding data and adequacy models.

¹ Numbers reflect changes in deer habitat capability resulting from previous timber harvest including Court authorized harvest through 1989.

² This value represents the present reduction in the entire minor harvest area.

³ This value represents the percent reduction in the entire analysis area.

As part of the timber harvest described in the alternatives, the Forest Service is considering several road management options to protect the brown bear and its habitat. These options, as described in the Mitigation section, include the administrative closure of various roads throughout Analysis Area 6. The immediate effect on the brown bear would occur primarily where there is proposed new construction. Since these areas have not been previously entered, controlled access would maintain limited human-bear encounters.

The road closure management proposals also include existing roads throughout the analysis area. In areas where an extensive road network already exists, the improvement of bear population numbers due to road closure management would be realized further into the future. Long-term effects to the brown bear population are discussed in the Cumulative Effects section. In addition, an illustration in that section compares the long-term effects on population numbers with and without the road closure options.

Table 4-14

Projected Reduction of Potential Sitka Black-tailed Deer Numbers Based on a Habitat Capability Model

VCU	Present Deer Habitat Capability	Alternative						
		1	2	3	4	5	6	7
Minor Harvest Area 3627								
236	295	0	11	11	0	0	0	5
237	236	0	0	18	19	18	19	14
238	244	0	0	28	28	29	28	17
Subtotal	775	0	11	57	47	47	47	36
Minor Harvest Area 3628								
235	971	0	0	0	0	47	31	10
Minor Harvest Area 3308								
239	318	0	6	6	0	4	0	11
240	184	0	0	0	0	8	0	0
241	152	0	0	0	0	18	0	0
242	333	0	7	7	7	14	0	7
243	502	0	22	14	17	9	17	12
244	208	0	0	0	1	12	0	3
245	636	0	0	0	0	0	0	3
Subtotal	2,333	0	35	27	24	65	17	36
Total	4,079	0	46	84	71	159	95	82

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See also Consolidated Appendix, Volume II, C-3; Theme Response 9 regarding data adequacy and models used.

4 Environmental Consequences

Table 4-15

Projected Percent Reduction of Potential Brown Bear Numbers Based on a Habitat Capability Model

VCU	Previous Change ¹	1	2	3	Alternative 4	5	6	7
<i>Minor Harvest Area 3627</i>								
236	64.3	0	7.1	14.3	0	0	7.1	0
237	22.2	0	0	0	55.6	55.6	55.6	55.6
238	0	0	0	54.5	54.5	54.5	54.5	54.5
Subtotal ²	32.4	0	2.9	23.5	32.4	32.4	35.3	32.4
<i>Minor Harvest Area 3628</i>								
235	16.7	0	0	0	0	11.9	52.4	2.4
Subtotal ²	16.7	0	0	0	0	11.9	52.4	2.4
<i>Minor Harvest Area 3308</i>								
239	45.0	0	0	5.0	0	0	0	5.0
240	0	0	0	0	0	0	0	0
241	37.5	0	0	0	0	12.5	0	0
242	60.0	0	0	0	6.7	6.7	0	0
243	48.5	0	3.0	3.0	6.1	6.1	3.0	0
244	50.0	0	0	0	0	14.3	0	7.1
245	53.1	0	0	0	0	0	0	0
Subtotal ²	45.8	0	1.0	1.5	2.2	4.5	1.0	1.5
Total ³	37.8	0	1.0	4.8	6.7	10.5	16.7	6.7

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See also Consolidated Appendix, Volume II, C-3 on data adequacy and models used.

¹ Numbers reflect change in brown bear capability resulting from previous timber harvest including Court authorized harvest to 1989.

² This value represents the present reduction in the entire minor harvest area.

³ This value represents the percent reduction in the entire analysis area.

Table 4-16

Projected Reduction of Potential Brown Bear Numbers Based on a Habitat Capability Model

VCU	Present Brown Bear Habitat Capability	Alternative						
		1	2	3	4	5	6	7
Minor Harvest Area 3627								
236	5	0	1	2	0	0	1	0
237	7	0	0	0	5	5	5	5
238	11	0	0	6	6	6	6	6
Subtotal	23	0	1	8	11	11	12	11
Minor Harvest Area 3628								
235	35	0	0	0	0	5	22	1
Subtotal	35	0	0	0	0	5	22	1
Minor Harvest Area 3308								
239	11	0	0	1	0	0	0	1
240	11	0	0	0	0	0	0	0
241	5	0	0	0	0	1	0	0
242	6	0	0	0	1	1	0	0
243	17	0	1	1	2	2	1	0
244	7	0	0	0	0	2	0	1
245	15	0	0	0	0	0	0	0
Subtotal	72	0	1	2	3	6	1	2
Total	130	0	2	10	14	22	35	14

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See also Consolidated Appendix, Volume II, C-3 on data adequacy and models used.

4 Environmental Consequences



Pine Marten

Pine Marten

The pine marten uses forested old-growth, beach fringe, and streamside riparian habitats. Over 90 percent of old-growth, 84 percent of forested, 76 percent of beach fringe, and 73 percent of streamside riparian habitats would remain under all the alternatives.

The habitat capability model information indicates less than an 18 percent reduction in pine marten numbers may be expected from the proposed timber harvest alternatives (Table 4-17). This potential reduction represents approximately 2 to 79 animals in a potential existing population of 250 (Table 4-18). The Pine Marten habitat capability model is available for public review in the planning records. The model evaluates timber stand ages, volume classes, and elevation. The model is used to estimate the effects on potential carrying capacity of marten by harvest alternative.

As part of the timber harvest described in the alternatives, the Forest Service is considering several road management options to protect the pine marten and its habitat. These options, as described in the Mitigation section, include the administrative closure of various roads

Table 4-17

Projected Percent Reduction of Potential Pine Marten Numbers Based on a Habitat Capability Model

VCU	Previous Change ¹	1	2	3	Alternative 4	5	6	7
<i>Minor Harvest Area 3627</i>								
236	53.1	3.1	37.5	37.5	0	0	18.8	3.1
237	0	0	0	0	70.0	70.0	70.0	60.0
238	0	0	0	20.8	70.8	70.8	70.8	70.8
Subtotal ²	22.4	1.3	15.8	22.4	40.8	40.8	48.7	39.5
<i>Minor Harvest Area 3628</i>								
235	0	0	0	0	0	4.5	46.6	2.3
<i>Minor Harvest Area 3308</i>								
239	51.3	2.6	5.1	0	0	0	0	2.6
240	0	0	0	0	0	0	0	0
241	72.2	0	0	0	0	5.6	0	0
242	72.2	0	0	0	0	0	0	0
243	71.8	0	1.4	2.8	2.8	1.4	1.4	1.4
244	77.4	0	0	0	0	0	0	0
245	74.6	0	0	0	0	0	0	0
Subtotal ²	65.4	0	1.1	1.0	1.0	1.0	1.0	1.0
Total ³	45.3	1.0	3.3	4.2	7.3	8.2	17.6	7.6

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3; theme response on data and models used.

¹ Numbers reflect changes in deer habitat capability resulting from previous timber harvest including Court authorized harvest through 1989.

² This value represents the present reduction in the entire minor harvest area.

³ This value represents the percent reduction in the entire analysis area.

throughout Analysis Area 6. The immediate effect on the pine marten would occur primarily where there is proposed new construction. Since these areas have not been previously entered, controlled access would maintain limited trapping activities.

The road closure management proposals also include existing roads throughout the analysis area. In areas where an extensive road network already exists, the improvement of pine marten population numbers due to road closure management would be realized further into the future. Long-term effects to the pine marten population are discussed in the Cumulative Effects section. In addition, an illustration in that section compares the long-term effects on population numbers with and without the road closure options.

Land Otter

Land otters generally occur close to the beach using beach fringe and streamside riparian habitats. The proposed harvest alternatives would have an effect on both of these habitats.

Alternatives 1, 2, and 7 would leave over 78 percent of the beach fringe and streamside riparian habitats. Alternative 5 would leave 76 percent of beach fringe and 73 percent of streamside riparian.



Land Otter

Table 4-18

Projected Reduction of Potential Pine Marten Numbers Based on a Habitat Capability Model

VCU	Present Pine Marten Habitat Capability	Alternative						
		1	2	3	4	5	6	7
Minor Harvest Area 3627								
236	15	1	12	12	0	0	6	1
237	20	0	0	0	14	14	14	12
238	24	0	0	5	17	17	17	17
Subtotal	59	1	12	17	31	31	37	30
Minor Harvest Area 3628								
235	88	0	0	0	0	4	41	2
Minor Harvest Area 3308								
239	19	1	2	0	0	0	0	1
240	20	0	0	0	0	0	0	0
241	5	0	0	0	0	1	0	0
242	10	0	0	0	0	0	0	0
243	20	0	1	2	2	1	1	1
244	7	0	0	0	0	0	0	0
245	18	0	0	0	0	0	0	0
Subtotal	99	1	3	2	2	2	1	2
Total	246	2	15	19	33	37	79	34

SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record). See Consolidated Appendix, Volume II, C-3, theme response on data adequacy and models used.



Vancouver Canada Goose

Bald Eagle

Bald eagles use beach fringe, estuarine fringe, and streamside riparian habitats. Over 75 percent of the original beach fringe and 70 percent of the streamside riparian habitats would remain under all the alternatives. No timber harvest will occur in the estuarine fringe habitat. Although timber harvest would affect some of these habitats, no eagle nest trees or buffer zones would be affected by any of the proposed alternatives.

Vancouver Canada Goose

Vancouver Canada Geese are unique among all subspecies of Canada geese in that they use forested habitat for nesting and brood rearing. Timber harvest activities in estuarine fringe, inland wetland, and forested habitats could affect these geese. No harvest is proposed in the estuarine fringe and inland wetland habitats and over 84 percent of forested habitats would remain.

Conclusions for Wildlife Habitat Effects

No major effects from additional timber harvest activities are expected on either the wildlife or their habitats. Evaluation of the entire Analysis Area reveals less than 5 percent of the overall habitats would be affected. Many of the effects would be less than 1 percent or even unmeasurable. Habitat capability models for the Sitka black-tailed deer and pine marten also show less than a 4 percent potential reduction in actual numbers due to timber harvest activities.

Fisheries

Each of the six action alternatives (i.e., 2 through 7) has potential for impacting the National Forest aquatic habitat in Analysis Area 6. The level of impact, if any, is dependent upon the application of Best Management Practices and Aquatic Habitat Management prescriptions as presented in the Regional Guide. Timber harvest adjacent to streams may affect water temperature and debris recruitment; road construction and use may cause increased sedimentation; and installation of road crossings may alter or eliminate access to anadromous fish habitat. Timber harvest standards and guidelines are applied on National Forests to minimize these potential impacts. Similarly, adherence to the National Forest Practices Act on private lands will minimize potential impacts to streams.

The potential for fisheries impacts increases as the disturbance increases along streams. Timber harvest to the stream bank is not proposed in any alternative along Class I or II streams. Rather, buffers of 25 to 100 feet in width would be left adjacent to streams where harvest takes place on National Forest land according to the Aquatic Habitat Management Handbook (USDA Forest Service 1986a) to mitigate any potential impacts. Table 4-19 shows the width and length of buffers along Class I and II streams for each alternative. No harvest is proposed along Class III streams in Analysis Area 6. The location of the proposed harvest units in relation to the Class I and II Aquatic Habitat Management Units (AHMUs) can be seen in the reproduced aerial photos on the Unit Cards in Appendix A-1, or on the Alternative Maps provided with this SEIS. The maps show more clearly where the streams are located and where the breaks between stream classifications occur.

Aquatic Habitat Management Unit (AHMU) prescriptions differ from the National Marine Fisheries Service (NMFS) 30-meter buffer policy in that AHMU prescriptions allow the opportunity for some management activities within buffer areas. These management activities may occur only after consideration of the specific needs of the stream based on site-specific criteria. Application of the NMFS 30-meter policy to this project would result in lower timber volumes, and would not necessarily provide a higher level of protection for the fisheries resource than that provided by the AHMU policy, which is designed to provide resource protection based on site specific needs. Murphy and Koski (1989) show that a 30-meter (100-foot) buffer provides 99 percent of the large woody debris (LWD) for Class I and II streams. Twenty-three meters (75 feet) would maintain 97 percent of LWD, 15 meters (50 feet) would maintain 90 percent of LWD, and 8 meters (25 feet) would maintain at least 83 percent of potential LWD.

Table 4-19

Buffer Width and Distance Along a Stream¹

Alternative	VCU	Unit Number	Class I		Class II		
			Buffer Width	Distance	Buffer Width	Distance	
2	236	38	100	2,100			
		39	100	2,000			
		40	100	2,400			
		41			50	2,000	
		Total Distance			6,500		2,000
3	236	38	100	2,100			
		39	100	2,000			
		40	100	2,400			
		41			50	2,000	
		238	91	50	500		
		101			100	1,500	
		14	100	1,200			
		15	100	1,200			
		16	100	1,800			
		9	100	2,300			
		10	100	4,400			
		8	100	2,000			
		7	100	500			
		242	218	75	2,000		
		243	108	75	1,800		
	Total Distance			17,200		3,500	
	4	237	31	50	2,000		
29			100	800			
28			25	1,300			
238			91	50	500		
			101	100	1,500		
		14	100	1,200			
		15	100	1,200			
		16	100	1,800			
		9	100	2,300			
		10	100	4,400			
		8	100	2,000			
		7	100	500			
		242	218	75	2,000		
		243	108	75	18,000		
Total Distance			39,500				

Continued

Table 4-19 (continued)

Buffer Width and Distance Along a Stream¹

Alternative	VCU	Unit Number	Class I		Class II	
			Buffer Width	Distance	Buffer Width	Distance
5	235	241	100	4,000		
		238	50	500		
		240	100	1,600		
	237	31	50	2,000		
		29	100	800		
			50	800		
		28	25	1,300		
	238	91	50	500		
		101	100	1,500		
		14	100	1,200		
		15	100	1,200		
		16	100	1,800		
		9	100	2,300		
		10	100	4,400		
		8	100	2,000		
		7	100	4,400		
	241	226			75	1,600
		227	75	500		
	242	217	75	300		
		218	75	2,000		
Total Distance				33,100		1,600

Continued

Table 4-19 (continued)

Buffer Width and Distance Along a Stream¹

Alternative	VCU	Unit Number	Class I		Class II	
			Buffer Width	Distance	Buffer Width	Distance
6	235	66	100	1,000		
		68	100	1,000		
	237	31	50	2,000		
		29	100	800		
			50	800		
	238	28	25	1,300		
		91	50	500		
		101	100	1,500		
		14	100	1,200		
		15	100	1,200		
		16	100	1,800		
		9	100	2,300		
		10	100	4,400		
		8	100	2,000		
		7	100	500		
	243	108	75	1,800		
Total Distance				24,100		
7	238	91	50	500		
		101	100	1,500		
		14	100	1,200		
		15	100	1,200		
		16	100	1,800		
		9	100	2,300		
		10	100	4,400		
		8	100	2,000		
		7	100	500		
	242	218	75	2,000		
Total Distance				17,400		

Source: SEIS Planning Record.

¹ Buffers are planned on both sides of the stream.

4 Environmental Consequences

The proposed construction of new roads and new stream crossings that will require application of prescriptions listed in the Aquatic Habitat Management Unit (AHMU) handbook and the 1986-90 FEIS standards and guidelines are summarized by alternative in Table 4-20. Each alternative proposes less than 1.5 miles of new road that would parallel Class I stream habitat and less than 0.9 miles of new road that would parallel Class II stream habitat. Alternative 6 would have the most potential for road related effects (2.2 miles) and Alternative 2 would have the least potential for road related effects (0.5 miles). The proposed number of road crossings ranges from seven for Alternative 2 to seventeen for Alternative 6.

The potential effects of the proposed alternative timber harvest plans on aquatic habitat should be minimal or eliminated by application of prescriptions such as those described in detail in the Aquatic Habitat Management Handbook (Forest Service 1986a) and the 1986-90 FEIS standards and guidelines. Standard AHMU prescriptions are described that will protect water quality and the productivity of fish habitat. The prescriptions help ensure attainment of management goals for each stream or AHMU class. Class I AHMUs have the most specifically defined, restrictive direction, and Class II and Class III are less restrictive. The prescriptions are organized into three levels including: (1) temperature sensitivity constraints; (2) management prescriptions involving large woody debris, water quality, streambank and channel stability, fish passage, and special road construction; and (3) management opportunity prescriptions to increase primary and secondary productivity. The prescriptions for tempera-



Table 4-20

Miles of Road Needing AHMU Protection Measures by Stream Class

Alternative	VCU	Miles in AHMU	
		Class I	Class II
2	236	0.1	0
	239	0.1	— ¹
	243	0.2	— ¹
	Total	0.4	0.1 ²
3	236	0.1	0
	238	0.8	0.4
	239	0.1	— ¹
	243	0.2	0
	Total	1.2	0.4
4	237	0.2	0
	238	0.7	0.3
	243	0.2	— ¹
	Total	1.1	0.3
5	235	0.3	0.2
	241	0.2	0
	244	0	0.1
	Total	0.5	0.3
6	235	0.3	0.5
	237	0.2	0
	238	0.7	0.3
	243	0.2	— ¹
	Total	1.4	0.8
7	237	0.2	0
	238	0.7	0.3
	239	0.1	— ¹
	243	0.2	— ¹
	244	0	0.1
	Total	1.2	0.4

SOURCE: SEIS Planning Record.

¹ This value is less than 0.05 miles.

² This total includes values less than 0.05 miles.

ture sensitive streams are examined first to determine possible management options since these prescriptions are overriding in importance. Management prescriptions for temperature sensitive streams, if applied, preclude some of the other prescriptions listed for other aquatic habitat concerns. Prescriptions for fish passage through crossing structures are guided by an economic analysis (i.e., Fish Passage Trade-off Evaluation, Forest Service 1986a), which compares the resource value to the additional expenses required to provide passage. Each Unit Card (Appendix A-1) describes 1986-90 FEIS standards and guidelines or AHMU prescription applications if needed.

Any potential impacts to fish production as a result of the proposed alternative timber harvest plans are expected to be minimal. This conclusion is based on the following:

- The amount of habitat affected is relatively small. A maximum of 3.9 percent, depending on alternative, of the available Class I and Class II habitat would potentially be affected by adjacent timber harvest and road construction activities.
- It is unlikely that all habitats would be impacted because of site specific management prescriptions described in the AHMU handbook.
- Measurable changes in stream temperatures will be avoided through the use of AHMU Handbook buffer prescriptions.

Watersheds

For the purpose of looking at impacts on watersheds, it is useful to address two types of watersheds: upland channels or mountain slope ravines, and lowland channels. Upland channels include mostly Class II AHMUs where the primary management objective is to protect water quality. These streams have little or no resident fish habitat. Lowland channels are primarily low gradient floodplain channels and moderate to low gradient alluvial fan and footslope channels. Lowland channels fall within the Class I and II AHMU categories where the primary management objective is to protect important anadromous and resident fish habitat. Table 4-21 shows the proposed harvest by channel type for all alternatives in Analysis Area 6.

Rain Gauge Near the Mouth of the Kadashan River



Table 4-21

Acres of Proposed Harvest by Channel Type

	VCU	Channel Type	
		<i>Lowland</i>	<i>Upland</i>
<i>Alternative 2</i>	236	226	485
	239	0	349
	242	50	321
	243	212	950
	Total	488	2,105
<i>Alternative 3</i>	236	226	364
	238	513	585
	239	0	349
	242	50	321
	243	0	628
	Total	789	2,247
<i>Alternative 4</i>	236	0	128
	237	257	164
	238	513	585
	239	0	148
	242	50	321
	243	0	842
	Total	820	2,188
<i>Alternative 5</i>	235	870	142
	236	0	128
	237	257	147
	238	513	585
	239	0	273
	240	0	140
	241	20	488
	242	82	486
	243	111	283
	244	0	471
	Total	1,853	3,143
<i>Alternative 6</i>	235	115	647
	236	0	128
	237	257	164
	238	513	585
	239	0	148
	243	381	635
	Total	1,266	2,307

(Continued)

Table 4-21 (Continued)

Acres of Proposed Harvest by Channel Type

	VCU	Channel Type	
		<i>Lowland</i>	<i>Upland</i>
<i>Alternative 7</i>	235	324	77
	236	0	375
	237	151	185
	238	330	402
	239	0	396
	242	50	321
	243	0	430
	244	0	270
	245	0	77
	Total	855	2,533

SOURCE: SEIS Planning Record

Streamflow

Forest vegetation influences stream runoff through water uptake for growth (transpiration) and through evaporation of precipitation intercepted by the forest canopy. Clearcut blocks may alter runoff through changes in snow storage and snow melt timing. Experience in the Pacific Northwest indicates that stream runoff can also be affected through conversion of overmature forest to a denser, more vigorous second-growth forest that may increase evapotranspiration losses and reduce streamflow during the summer growing season.

Streamflow concerns expressed in 1986-90 FEIS appeals regarding timber harvesting revolve around two perceived issues:

- initial peak flow increases following timber harvest that could accelerate channel erosion and destruction of fish habitat, and
- long-term reduction in summer low flow following establishment of second-growth timber stands that could result in loss of summer fish rearing habitat.

The Forest Service response to the second 1986-90 appeal issue is: "The preponderance of available scientific evidence, and monitoring of past management practices, indicates that old-growth conversion has not been demonstrated to produce a measurable decrease in summer low flows in Southeast Alaska. To date, it has not been observed that old-growth conversion to second growth produces any significant changes in summer low flows (Meehan, et al. 1969, Rothacher 1970, Harr 1976)." [1986-90 FEIS Appeal Record]

There are no studies that quantify the exact level of harvest that will cause significant changes in flow regime and sediment production for watersheds in Southeast Alaska. However, it is known that a relationship does exist between the total amount of harvest within a watershed over a period of time and the probability of adverse effects on water quality, flow regimes, and sediment production.

A large body of scientific literature has been compiled on the effects of timber harvesting on water yield from forested watersheds. Bosch and Hewlett (1982) in a review of 94 catchment experiments found that an average of 25 percent to 30 percent harvest level was required to detect measurable effects in stream runoff. Water yield studies in the Pacific Northwest have shown an average of 25 percent increase in annual runoff when 25 percent to 100 percent of a watershed was clearcut harvested (Rothacker 1965, 1970, Rothacker, et al. 1967, Harr 1976,

1983). However, in the same studies the number of summer low-flow days significantly decreased the first few years after harvesting. No increases in destructive peak flows were observed except in a case where 15 percent of the watershed was severely compacted by skid trails and roads. In the Maybeso Creek watershed on Prince of Wales Island no detectable changes in streamflow were found after 25 percent of the watershed was clearcut (Meehan, et al. 1969). Streamflow increases from the Fool Creek watersheds in Colorado have been monitored for over 30 years. Recent analysis of that data by Troendle and King (1985) indicates that the annual variation in streamflow is likely to be the result of long-term climatic trends instead of vegetation regrowth, as was formerly thought.

In general, these research findings indicate changes in stream flow due to vegetative manipulation are difficult to quantify as is the duration of those changes. Also, stream flow changes are highly variable between watersheds based on differences in geography, landforms, soil types, vegetation, climate, and size of watershed and are difficult to detect.

Much less information exists for timber harvesting effects on snow storage and snow melt processes, particularly in the rain dominated coastal runoff regimens found in Southeast Alaska. Recent studies have shown that clearcutting in transient snow zones can increase the magnitude of some high flow events in Pacific Northwest watersheds (Christner and Harr 1982, Harr 1981). Harr (1981) estimates that increased heat transfer to snowpacks in clearcut units may result in up to 25 percent increase in soil water input under certain climatic conditions. However, little data are available to evaluate the influence of clearcuts at middle and upper watershed elevations on winter rain-on-snow peak runoff events (Chamberlin 1982). Rain-on-snow runoff events may occur infrequently in Southeast Alaska under conditions of wet, shallow snowpack coupled with heavy rain, high winds, and warm air masses. The probability for conditions existing within a given watershed to trigger a winter flood event will vary according to elevation, aspect, and local climate.

Timber harvest levels proposed by alternative are shown in Table 4-2. Cutting units are generally dispersed over individual watersheds, and road density within affected watersheds is relatively low. These factors indicate that the level of timber harvest proposed in 1986-90 would not result in appreciable changes in average flows or peak flows.

Potential effects of timber harvest on winter peak flows cannot be fully evaluated due to lack of data and knowledge about rain-on-snow runoff processes in Southeast Alaska. Because cutting units are dispersed throughout watersheds and the relative percentage of clearcut units to total watershed area is small, the risk of increasing the frequency of destructive rain-on-snow runoff peaks is expected to be low.

Sediment

Erosion of soil and subsequent sedimentation in streams is a major concern associated with timber harvesting activities and road construction and has resulted in stringent standards and guidelines. High concentrations of fine sediment in surface water and stream beds may adversely affect fish egg incubation in gravel beds and fry emergence from the gravel. Extremely high levels or chronic inputs of suspended sediment can also affect fish behavior and the abundance of aquatic insects, the primary fish food during the freshwater rearing phase of anadromous fish life cycles.

Timber harvesting activities may cause sedimentation in a number of ways, for example:

- stream channel and stream bank disturbances from yarding and felling trees adjacent to or across stream channels or from installation of bridges and culverts;
- road runoff from road construction and use; and
- mass soil movement (landslides) from road failure or slope failures in harvest units.

The region is developing Best Management Practices, the purpose of which is to reduce impacts to water quality associated with land management activities with the overall goal of

meeting State water quality standards. In a Memorandum of Understanding between the Forest Service and Alaska Department of Environmental Conservation, the agencies have agreed to document management practices that effectively minimize the impacts from nonpoint sediment sources caused by timber management activities (Forest Service 1980b). Two watersheds in the Chatham Area have been monitored for a number of years to evaluate the effectiveness of some Best Management Practices in maintaining water quality. Information on sediment transport from these studies is felt to be representative of stream conditions and harvesting techniques proposed in the 1986-90 Operating Plan. Sediment monitoring data were collected from the Indian River and Kadashan River watersheds for a number of years prior to and following logging activity (Paustian 1988). Sediment discharge measurements taken on the mainstem of Indian River showed no significant change in sediment delivery following logging and road building that affected 8 percent of an 11 square mile watershed. In the Kadashan River study, sediment sources from road building were measured below road crossings on three first- and second-order tributary streams. Short-term impacts of road building resulted in increased suspended sediment yield equivalent to 2 percent of the estimated annual yields. Potential increases in total estimated sediment yield over a two-year period after road construction ranged from 20 percent to 66 percent in the three study streams. However, Paustian (1988) predicted that sediment inputs of this type and amount would not have been detectable in the mainstem of Kadashan River due to large in-channel sediment storage that tends to lessen sediment delivery from short-term disturbances.

The conclusion reached from these studies is that logging disturbances were not great enough to cause changes in sediment yield above natural levels of sediment transport measured in the river prior to logging. This interpretation of the study results, however, only applies to low-level water quality impacts that occur within the first few years following logging. Data concerning the long-term impacts of logging on sediment in this area is not available. Swanston (1985) has instituted studies that will better address cumulative erosion and sediment delivery impacts associated with logging on landslide-prone areas in Southeast Alaska.

The Unit Cards in Appendix A-1 document the application of AHMU Handbook buffer prescriptions. These buffers which are prescribed for all Class I and Class II streams, in addition to maintaining temperature stabilizing vegetative cover and a source of large woody debris, will provide undisturbed areas along streams that will act as a catch basin or filter to intercept potential sediment originating in disturbed areas in the harvest units.

Marine Environment

Since no new log transfer facilities are being proposed, the effects of the alternatives will be small incremental additions to existing bark deposits, shading effects, etc. These would result in minor effects on benthic organisms from any of the action alternatives.

The effects of a log transfer facility on salmon and herring is difficult to address as no known data are available on the relationship between a log transfer facility and these species. Both species inhabit the unimpacted water column, as opposed to the impacted substate, and negative impacts are expected to be small, if any. The added incremental effect of any of the action alternatives would be small. In general, any potential deleterious effects to the marine environment would be extremely small.

The False Island and Sitkoh Bay LTFs, which are proposed for use in various combinations with the Corner Bay LTF under Alternatives 2, 3, 5, and 7, have been inactive for several years. The interruption in maintenance caused by this inactivity has caused these log transfer facilities to fall into disrepair. If reconstruction is required to operate a facility, revised permits may have to be obtained that would require a site-specific environmental assessment. The Todd LTF was designed as a short-term log transfer facility, which means it was intended for use only during a single entry. Reactivation of short-term facilities usually involves reconstruction.

The Corner Bay Log Transfer Facility will be Upgraded in the Near Future



Land Status

The potential effects of harvest and road construction activities on land status and suggested mitigating actions are described in this section. Each of the action alternatives would affect private or selected land, the Angoon Withdrawal area, or special permit sites somewhat. Alternatives 2 and 6 would have the least impact on private lands, Native Allotment applications, and special-use permit areas; while Alternative 5 would have a substantially greater effect than the other alternatives.

None of the alternatives would affect private or selected land, or special permit sites within VCUs 236 or 245.

No new LTFs are proposed by any of the alternatives. The Forest Service holds valid Army Corps of Engineers permits and Alaska Department of Natural Resources (DNR) easements for the existing log transfer facility sites proposed for use under the alternatives.

An existing haul road passes through the Angoon Withdrawal area in VCU 243. The affected road would be used under all action alternatives except Alternative 6. If the land is conveyed to a Native Corporation, an easement should be reserved under any of the alternatives, including the no action alternative, in the event that the road is needed in the future. In addition to the above general effects; specific effects that could occur under each alternative are described below.

Alternative 2

The existing haul road to the Sitkoh Bay LTF passes in the vicinity of two special use permit sites in VCU 243 where sawmills are authorized. Use of this road, however, is not expected to interfere with these facilities.

Alternative 3

Two units in VCU 238 are in the vicinity of an electronic site authorized by Forest Service special use permit. The electronic site should be verified on the ground.

Alternative 4

Alternative 4 would have the same effect in VCU 243 as Alternative 2, and in VCU 238 as Alternative 3.

Alternative 5

Units 235-238 are in the vicinity of private land and a special use permit site located at Kadashan Bay (VCU 235). The special use permit authorizes the Alaska Department of Fish and Game (ADF&G) and others, use of a cabin and weir for research purposes. Timber harvest and haul will likely be evident from these sites.

Harvest units are planned within the Angoon Withdrawal on lands selected by both Kootznوو and Sealaska Corporations. The units include 234 in VCU 240, 226-233 in VCU 241, and 220-225 and 219 in VCU 242. A written agreement must be obtained from both Kootznوو and Sealaska Corporations to allow harvest of these units because they are located within the APC contingency area.

In VCU 243, unit 210 is approximately 3/4 mile from unsurveyed private land at the mouth of Sitkoh Creek. The existing haul road to the Sitkoh Bay LTF passes near two special use permit sites in VCU 243 where sawmills are authorized. Use of this road, however, is not expected to interfere with these facilities.

In VCU 244, unit 209 is approximately 3/4 mile from private land at the mouth of Sitkoh Creek and Native Allotment application J-011886.

Alternative 6

This alternative could have an effect on lands of special status in VCUs 238 and 239. Potential effects in VCU 238 are the same as those described for Alternative 3 above. In VCU 239, a proposed haul road comes within 1/2 mile of Basket Bay. Its potential effects are described above as a general consequence effecting all alternatives.

Alternative 7

In VCU 235, units 71 through 75 are approximately 1/2 mile from private land and a special use permit site located at Kadashan Bay. The special use permit authorizes ADF&G and others to use a cabin and weir for research purposes. Timber harvest and haul will likely be evident from these sites.

Harvest unit 2 in VCU 237, and units 3, 4, and 6 in VCU 238 come within 1/2 mile of an electronic site (VCU 238) authorized by a special use permit. The electronic site should be identified on the ground to avoid its disturbance.

Recreation

To determine the environmental consequences for the recreation resource in Analysis Area 6, it is necessary to examine expected future trends in recreation use and then determine how management activities might influence those trends. Although historical use figures fluctuate widely and depend somewhat on uncontrolled variables such as weather conditions and wildlife and fish populations, general trends are apparent. Hunting, fishing, boating, and saltwater canoeing and kayaking will be the predominate recreational activities. Use by out of state residents (currently about one third of the total use) is expected to grow as interest continues to develop in the unique experience of Southeast Alaska. There is potential for increased outfitter/guide activities and for commercial floating lodges in future development in portions of Analysis Area 6. Facility development will correspond with anticipated growth and reflect user preferences for outdoor activities. Access will remain saltwater oriented.

*Planks are Commonly Used
to Cross Wet, Boggy Areas in
Southeast Alaska*



These predicted trends are based on the following assumptions:

- a. Alaska's population growth has leveled off. Declines in some communities may occur as the economy changes.
- b. Tourism in the State has been increasing at 5 percent per year.
- c. Recreation cabin use on the Chatham Area of the Tongass National Forest is increasing at an average rate of nearly 2 percent per year.
- d. State transportation plans do not call for ferry service to Analysis Area 6.
- e. State surveys have shown that recreation activity preferences by residents continue to be boating, fishing, and hunting.

Due to no source of public transportation to Analysis Area 6, recreation use of the area is limited primarily to residents of Corner Bay logging camp in Analysis Area 6, and residents of Tenakee Springs who must access by boat across Tenakee Inlet. Recreational use of Analysis Area 6 is not expected to increase since public transportation is not planned under the alternatives or in the future. In general, low recreational use and few Forest Service managed recreation sites implies that the impacts of proposed activities on recreation in this area will be low in magnitude and extent.

The impacts on recreation were assessed by analyzing the change in Recreation Opportunity Spectrum (ROS) classes that would result under each alternative and the effects of each alternative on specific recreation sites. The ROS classes are used to describe the recreational setting. Changes in ROS classes that would result from the alternatives provide an indication of the effects of the alternatives on the recreational setting, as well as recreation opportunities. The effect of each alternative on recreation sites was evaluated by analyzing the cutting units proposed under each alternative and their relationship to known recreation sites.

4 Environmental Consequences

Table 4-22 presents the resulting ROS classes under each alternative for all of the Analysis Area 6. The changes in ROS classes do not consider land ownership. In general, all of the action alternatives would result in a shift of ROS classes from primitive and semi-primitive classes to roaded classes.

Alternative 1

The No Action Alternative would maintain the existing recreational character of Analysis Area 6, as described in Chapter 3 Affected Environment, through the end of the planning period.

Alternative 2

Harvest and road construction in the northwestern drainage in VCU 236 would result in more roaded opportunities and less primitive opportunities there, available primarily to residents of the Corner Bay logging camp, and occasionally to Tenakee Springs residents or others who are able to transport off-road vehicles (ORVs) to the area by boat.

Harvest is proposed in VCU 239, but would not affect any recreation sites or opportunities.

Current semi-primitive activities will shift to more roaded activities along existing and proposed new roads in VCUs 241 through 245 with the reopening of the False Island camp. New roads and harvest units are proposed in VCUs 242 and 243. Roaded activities, which would be conducted primarily by members of the False Island logging camp, may include use of four-wheel drive vehicles and other ORVs, including snowmobiles, and bicycles. Harvest units proposed in VCU 243 would not be within view of two private dwellings located at Sitkoh Bay, but noise and traffic from the roads and LTF on the eastern side of the Bay might be detectable from these residences.

Alternative 3

In VCUs 236, 239, and 242, Alternative 3 proposes to harvest the same units and would result in the same impacts on recreation as described above for Alternative 2. The reopening of the False Island camp will result in similar changes in VCUs 241 through 245 as described above under Alternative 2. Alternative 3 proposes to harvest less volume than does Alternative 2 in VCU 243, but the effects on recreation sites would be the same. As with Alternative 2, the area would shift from providing semi-primitive opportunities to roaded opportunities.

Currently, no roads or harvest units are located in VCU 238. Alternative 3 would result in harvest and road construction in approximately half of this VCU, and would connect it to the

Table 4-22

Recreation Opportunity Spectrum Classes Resulting from the Alternatives in Acres

Alternative	Primitive I	Primitive II	Semi- Primitive Non-Motorized	Semi- Primitive Motorized	Roaded Natural	Roaded Modified	Rural
1	8,590	0	105,137	9,682	6,073	40,590	210
2	8,590	0	101,009	9,682	6,205	44,586	210
3	8,590	0	101,059	9,682	6,205	44,536	210
4	8,590	0	101,001	9,365	6,073	45,043	210
5	8,590	0	103,138	7,921	2,553	48,010	210
6	8,590	0	99,094	9,365	6,853	46,170	210
7	8,590	0	99,077	9,365	4,680	48,360	210

SOURCE: SEIS Planning Record.

Corner Bay LTF and logging camp. Current primitive recreational opportunities would shift to roaded opportunities with use of four-wheel drive vehicles, motorbikes, ATVs, and snowmobiles, primarily by residents of the Corner Bay logging camp.

Alternative 4

The Kadashan Bay road system would be completed and would connect the False Island road system with the Corner Bay road system. Connecting these road systems would provide residents of Corner Bay logging camp access to much of Analysis Area 6, resulting in fewer primitive opportunities with more social encounters in those VCUs with roads.

VCU 237 has never been roaded or harvested and Alternative 4 would result in harvest and roads distributed in almost half of its area. The recreation activities would shift from primitive to roaded, including use of ORVs, four wheel drive vehicles, motorcycles, and snowmobiles, primarily by Corner Bay camp residents.

The proposed harvest activities and effects on recreation sites and opportunities in VCU 238 would be the same as those described above for Alternative 3. The activities proposed in VCU 242 would be the same as those described above for Alternative 2.

Because previous harvest took place in VCU 243 in 1978, the effect of proposed harvest there on recreation activities would be minimal. Alternative 4 proposes to harvest about one-fourth less acreage in VCU 243 than Alternative 2; however, the effect on recreation sites would be similar to those described above under Alternative 2. The completion of Kadashan Road could result in more use of this VCU by residents of the Corner Bay, Sitkoh Bay, and Tenakee Springs communities.

Alternative 5

Alternative 5 does not propose to complete the Kadashan Road through VCU 235 although timber harvest is proposed throughout the VCU. Part of the road is already in place and partial completion of the road would result in a larger part of the VCU being classified as roaded modified. The roaded recreational activities currently taking place in this VCU would be expected to increase under this alternative and the semi-primitive opportunities currently enjoyed by the residents of Tenakee Springs and Corner Bay logging camp would be expected to decrease.

In VCU 237, the proposed harvest for this alternative is the same as for Alternative 4 and, in VCU 238, the proposed harvest is the same as for Alternative 3. The effects on recreation resources in these VCUs would be the same as the aforementioned alternatives and are described above.

In VCU 239, one unit of 113 acres is proposed for harvest. Because this VCU has been previously logged and the new harvest would take place in a previously roaded area, no impacts to recreation would be expected.

In VCU 240, one harvest unit of 140 acres and road construction between Little Basket Bay and Basket Lake are proposed. This VCU has not been previously logged or roaded and the proposed activities would result in a shift away from semi-primitive recreation opportunities to roaded opportunities, primarily by residents of the False Island logging camp.

Under Alternative 5, road construction and timber harvest would take place in VCUs 241 and 242. Although these VCUs are roaded and contain land classified as roaded modified, their recreational use has been limited by access because the roads are not connected to any populated areas. Connection of these roads to the False Island road system and reopening of the False Island logging camp would result in a shift away from more primitive recreational activities to more rural activities in these VCUs. In VCU 242, the effect on recreation opportunities would be similar to those described above for Alternative 2, but greater.

Timber harvest and road construction would take place in VCUs 243 and 244 under Alternative 5. Impacts to recreation opportunities would be similar to those described above for Alternative 2, however, of less magnitude. In both VCU 243 and 244, connection of the False Island road system and reopening of the False Island camp would provide False Island residents access to the eastern side of Analysis Area 6.

Alternative 6

In VCU 235, the Kadashan Road would be completed and connect the Corner Bay road system to the False Island road system under this alternative. Timber harvest is also proposed in this VCU. The effect of these activities on recreation opportunities in VCU 235 would be similar to those described above for Alternative 5, however, of greater magnitude. By connecting the Corner Bay LTF and logging camp to the False Island road system through Kadashan, the recreation activities in all roaded VCUs would become more road-oriented with use of four-wheel drive vehicles, ORVs, ATVs, motorcycles, and perhaps bicycles.

In VCUs 237 and 238, the same harvest units with similar effects on recreation, are proposed as with Alternatives 4 and 3, respectively, for these VCUs.

For VCU 243, approximately one-fourth of the units and volume are proposed for Alternative 6 that are proposed for Alternative 2. The impacts to recreation opportunities would be similar to those described above for Alternative 2, but of less magnitude.

Alternative 7

Under Alternative 7 timber harvest and/or new road construction are proposed in VCUs 235 through 239, and 242 through 245. In VCU 235, timber harvest is proposed along the existing Kadashan road system and the logs would be transported through the Corner Bay LTF. Its effect on recreation opportunities would be similar to those discussed above for Alternative 5, but of less magnitude.

In VCU 236, the effect of harvest activities on recreation opportunities would be similar to those discussed above for Alternative 2, but of about half the magnitude.

Although Alternative 7 would harvest less volume from VCU 237 from fewer units of larger size than Alternative 4, the impact and its magnitude on recreation opportunities would be the same.

Alternative 7 proposes timber harvest and road construction in VCU 238. The proposed units would result in road construction and timber harvest distributed in about half of the VCU area and would have the same effect on recreation sites as was discussed above for Alternative 3. Its effect on recreation opportunities would be similar, but less than those from Alternative 3.

In VCU 239, two additional drainages in this VCU would be opened to road access, thus, increasing the roaded recreation opportunities and decreasing semi-primitive nonmotorized opportunities.

The opening of the False Island logging camp would increase roaded recreation use in all VCUs accessed by the False Island road system. The effects of harvest activity in VCU 242 would be the same as discussed above for Alternative 2.

In VCU 243, Alternative 7 proposes harvest of less than half the units and volume as Alternative 2; however, the effects on recreation sites would be nearly the same. Twenty five percent less acres would shift from semi-primitive nonmotorized classes to roaded classes under Alternative 7 than under Alternative 2, indicating less impact on recreation opportunities.

Harvest activities proposed in VCU 244 would result in the same effect on recreation sites as Alternative 5. Because Alternative 7 proposes to harvest only about one-third of the volume in this VCU as Alternative 5, the magnitude of effect on recreation opportunities is less.

Alternative 7 is the only one to propose new harvest in VCU 245, where timber was previously harvested in the 1960s. Because new harvest is proposed along the existing road system, there would be no change in the recreation opportunities. Further, no recreation sites in this VCU would be affected.

Visual Resources

Visual Perspective Plots Help Planners Evaluate Potential Impacts

Many of the management activities proposed under the action alternatives would be visible to people from watercraft or aircraft. Impacts of the alternatives on visual resources were evaluated by comparing the changes in visual condition acreage that would result under each alternative. Changes in visual condition on National Forest Service land for those VCUs affected by the alternatives are shown in Table 4-23. In addition, National Forest Service land that would be visually affected by the alternatives was evaluated for consistency with the assigned Visual Quality Objectives (VQOs) presented in Chapter 3, Table 3-24. See the glossary for definitions of the visual condition classes and VQOs.

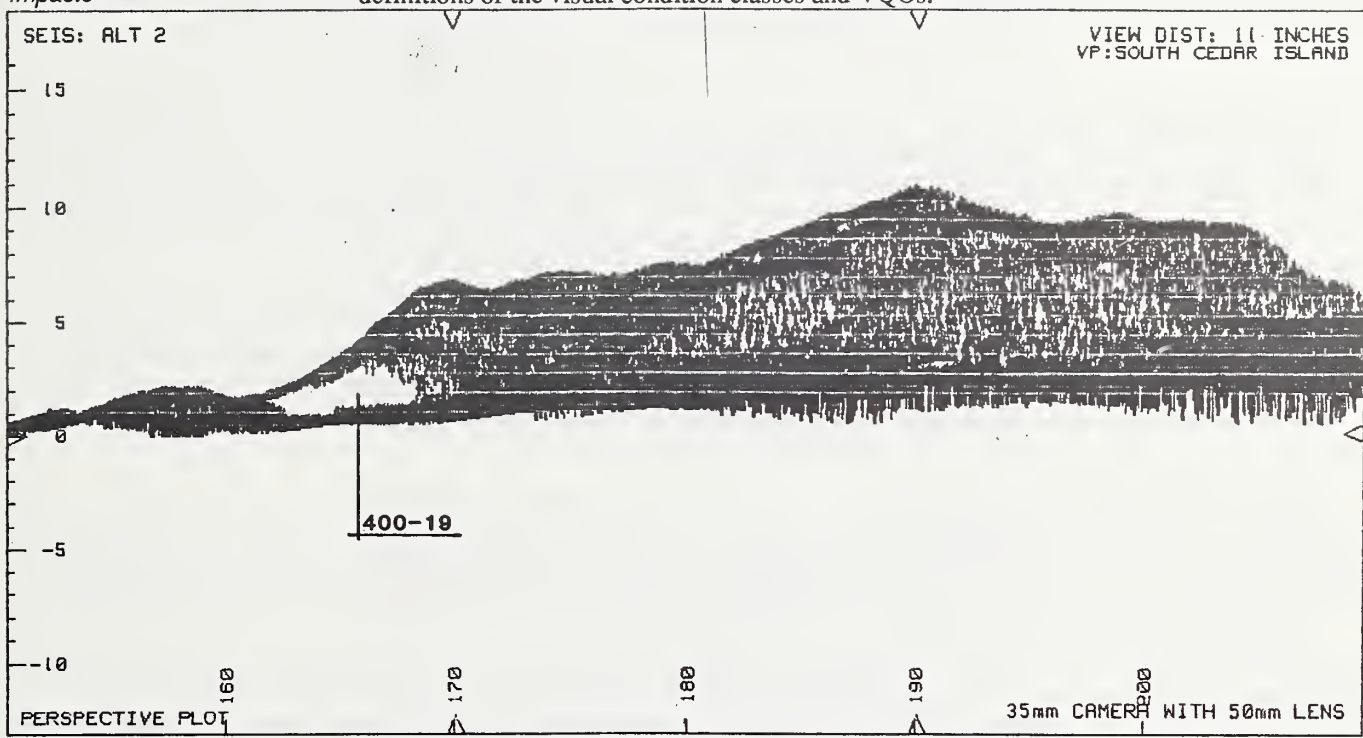


Table 4-23

Changes in Visual Condition in Acres

Visual Condition Classes (Type)	Alternative						
	1	2	3	4	5	6	7
I	117,674	100,721	94,242	97,355	93,071	96,867	89,608
II	6,084	5,483	5,383	5,524	275	2,072	2,253
III	4,275	3,228	3,228	3,228	1,288	4,275	3,228
IV	10,451	15,430	15,430	14,547	15,023	23,051	30,256
V	17,680	31,302	37,781	35,410	37,821	29,799	29,658
VI	13,119	13,119	13,119	13,119	14,641	13,119	14,769

SOURCE: Visual Resource Inventory for the Chatham Area, Tongass National Forest (Forest Service 1983b, 1984b).

Alternative 1

Alternative 1, the No Action Alternative, proposes no further harvest beyond the completion of activities allowed under the Court's decision in *Tenakee Springs v. Courtright*. Under this alternative, the existing visual conditions presented in Table 3-20 would be maintained and the assigned VQOs (Table 3-24) would be met.

Alternative 2

Harvest activity or road construction would take place in four VCUs under Alternative 2. Two VCUs, 236 and 242, would meet the assigned VQOs while portions of VCUs 239 and 243 would not.

In VCUs 236 and 242 timber harvest has occurred for a number of years and dominates the existing viewsheds. The visual changes in VCUs 236 and 242 would appear as moderate impacts to this landscape consistent with the assigned modification and maximum modification VQOs. In both of these VCUs viewers could expect to see contrasts of color, texture, and line in the middleground resulting from harvested areas and associated logging activities.

In VCU 239, the existing and proposed harvest units on the slopes north of Kook Lake would result in a major visual impact when viewed from the lake and the small plane route accessing the Forest Service recreation cabin at Kook Lake. Proposed and existing logging activities in this area would preclude meeting the assigned Retention and Partial Retention VQOs, but would be more consistent with the maximum modification VQO when viewed in the foreground and middleground.

From the Sitkoh Lake Trail, the small boat route in Sitkoh Bay, and the small plane route through Sitkoh Pass, viewers of VCU 243 could expect to see strong contrasts of color, texture, and line resulting from past and proposed logging activities. Visual impacts would not meet the assigned Partial Retention VQO, but would appear consistent with the modification and maximum modification VQOs.

Alternative 3

Harvest activities would occur in five VCUs under Alternative 3 and the effects would be consistent with the assigned VQOs in VCUs 236, 238, and 242. Portions of VCUs 239 and 243 would not meet the assigned VQOs.

The visual changes in VCUs 236, 238, and 242 would appear as moderate impacts to the landscape. In VCUs 236 and 242 visual impacts would be the same as described for Alternative 2. In VCU 238, proposed harvest activities would be consistent with the assigned modification VQO as viewed in the middleground from the Alaska Marine Highway and small boat route in Chatham Strait. Proposed units facing Chatham Strait are fairly small and located along lower elevations allowing existing vegetation to partially screen their appearance. The majority of the proposed harvest units are located in the upper drainages, which are obscured from view for the most part.

Visual impacts to VCUs 239 and 243 would range from moderate to major in appearance due to the size, spacing, and intensity of proposed and existing harvest units. In VCU 239, the visual effects would be the same as those described for Alternative 4. In VCU 243, the visual impacts would be similar to those described for Alternative 2. No harvest units are proposed near the head of Sitkoh Bay as in Alternative 2, but previous harvest in this area is still very obvious and when combined with the proposed harvest, the landscape would appear heavily altered from Sitkoh Bay.

Alternative 4

Four VCUs would be entered under Alternative 4, of which three (VCUs 237, 238, and 242) would meet assigned visual quality objectives. Portions of VCU 243 would not meet assigned VQOs.

Around Trap Bay, in VCU 237, visual changes would appear as minor to moderate disturbances in the lower elevations, consistent with the assigned modification VQO. When viewed in the middleground from the Alaska Marine Highway and small boat routes in Tenakee Inlet, the low elevation of the proposed units and the existing surrounding vegetation would partially screen these logging activities.

Visual impacts from proposed harvest in VCU 238 would appear as moderate impacts to the landscape. These impacts would be the same as described for Alternative 3. In VCU 242, the moderate impacts from proposed logging activities would be the same as described for Alternative 2.

In VCU 243, the visual impacts would be similar to those described for Alternative 3. Proposed harvest units are located among existing units in the upper drainages of Sitkoh Bay. As with all other alternatives in this VCU, existing and proposed logging activities tend to dominate the visual field.

Alternative 5

Under Alternative 5, nine VCUs would be entered. Three VCUs (237, 238, and 240) would meet the assigned visual quality objectives, while six VCUs (235, 239, 241, 242, 243, and 244) would not. Among the alternatives, Alternative 5 has the most VCUs that fail to fully meet the assigned VQOs.

The visual changes in VCUs 237 and 238 would appear as minor to moderate disturbances to the present predominantly natural appearing landscape. In both VCUs visual changes would be the same as those described for Alternative 4. In VCU 240, a natural appearing landscape would still be the dominant visual setting. The single harvest unit proposed, located in Little Basket Bay facing Chatham Strait, would meet the assigned modification VQO when viewed from the middle ground from the Alaska Marine Highway and small boat route in Chatham Strait.

In the Kadashan drainage in VCU 235, major visual changes would result due to the large size and spacing of proposed harvest units. As seen in the middleground from the small boat and ferry routes in Tenakee Inlet, proposed logging activities would be consistent with a maximum modification VQO rather than the assigned partial retention VQO. Visual changes to the presently natural appearing slopes to the east of Kadashan Bay would dominate views from the recreational use area around the Bay. Harvest units would also dominate the scene from the proposed road from Kadashan to Sitkoh Bay, which would be designated Sensitivity Level 2. Proposed units are concentrated on the eastern side of this VCU, leaving the remaining portions in a natural appearing condition.

In VCU 239, the visual effects of this alternative would be similar to those described above for Alternative 2. Visual impacts would be relevant primarily to visitors using the Forest Service recreation cabin and Kook Lake for recreation purposes.

In VCU 241, the concentration of existing and proposed units on the hillsides facing Chatham Strait would create a strong visual contrast in the landscape. As seen in the middleground from the small boat and ferry route in Chatham Strait and small plane route along the coastline, the visual setting would be consistent with the maximum modification VQO rather than its assigned modification VQO.

In VCU 242 harvest units would be located among existing units in the upper drainage as well as on the previously unharvested hillsides facing Chatham Strait from White Rock toward Point Hayes. In the upper drainages as seen from the small plane route, changes would be apparent, and would visually dominate the landscape. The large harvest units proposed on the previously unharvested hillsides facing Chatham Strait would be consistent with the maximum modification VQO rather than the assigned partial retention and modification VQOs.

In VCU 243, the visual effects of Alternative 5 would be the same as described above for Alternative 2.

In VCU 244, proposed units would continue to change the visual character of the landscape, which is currently altered by past harvest activities. With the implementation of this alternative, visitors using the Sitkoh Lake Trail and the Forest Service cabin on the lake shore could expect to see a mix of new harvest with sharp visual contrasts of color, texture, and line, among previously logged areas that have begun to regenerate. They could also expect to see natural appearing landscapes of old-growth timber, alpine, and rocky peaks. The resulting visual setting would be inconsistent with the partial retention and modification VQOs assigned to this VCU.

Alternative 6

Four VCUs would be entered under Alternative 6. Of those four, two VCUs (237 and 238) would meet the assigned VQOs while portions of VCUs 235 and 243 would not.

The visual changes in VCUs 237 and 238 would result in minor to moderate visual impacts to the landscape, consistent with their assigned VQOs. In both VCUs the effects of this alternative would be the same as those described for Alternative 4.

In VCU 235, proposed harvest units would be located in the upper Kadashan drainages away from Kadashan Bay and would be mostly screened from water-based viewing points in Tenakee Inlet. These units would be visible from the Level 2 proposed road from Kadashan to Sitkoh Bay. Logging operations on the eastern side of this VCU would appear as minor to moderate changes to the presently natural-appearing landscape. Overall, this alternative would leave the majority of VCU 235 natural-appearing even though its assigned partial retention VQO would not be fully met.

In VCU 243, the larger size and closer spacing of harvest units would result in moderate to major visual impacts. The effects would be similar to those described for Alternative 2.

Alternative 7

Under Alternative 7, nine VCUs would be entered for timber harvest or road construction. Four VCUs (236, 237, 238, and 242) would meet the assigned VQOs, while portions of the remaining five VCUs would not.

The visual changes in VCUs 236 and 242 would appear as moderate changes to the landscape comparable to those described for Alternative 2. In VCU 242, the hillsides facing Chatham Strait, from White Rock to Point Hayes, would remain in a natural-appearing condition. The proposed units would be interspersed among existing units in the upper drainages, obscured from water-based viewing points.

In VCU 237, the proposed harvest units around Trap Bay would appear as minor to moderate disturbances, the same as those described above in Alternative 4. These changes and those resulting from the remaining proposed harvest units in this VCU would be consistent with the assigned modification VQO. Their lower elevation and surrounding vegetation would assist in partially screening them from middleground views in Tenakee Inlet.

In VCU 238, the visual effects of proposed harvest units facing Chatham Strait would be similar to those described for Alternative 3.

If Alternative 7 was implemented, VCUs 235, 239, 243, 244, and 245 would not fully meet the assigned VQOs. In VCU 235, proposed harvest units adjacent to Kadashan Bay would appear in sharp contrast to the surrounding natural appearing landscape. The appearance of these units as viewed from the water-based viewing points in Tenakee Inlet would be more consistent with a modification VQO than with the assigned partial retention VQO. The majority of the Kadashan drainage, however, would still remain in a natural appearing condition.

In VCU 239, the most notable visual impact would be disturbance on hillsides north of, and the drainages feeding Kook Lake, which are visible from the Forest Service cabin and Kook Lake. Visitors could expect to see past logging activities in varying degrees of regeneration and new harvest areas that sharply contrast the surrounding landscape in color, texture, and line. Visual changes in this VCU would result in a more modified visual setting than was planned in the assigned VQOs.

In VCU 243, this alternative intersperses harvest units among the existing units in the upper drainages of Sitkoh Bay. While this alternative would not change the visual appearance along the shorelines of Sitkoh Bay, the overall visual character of this VCU would be of a changing forest environment. Throughout this VCU, the changes would be consistent with modification and maximum modification VQOs, while the assigned VQOs include some partial retention as well.

In VCU 244, proposed activities would be similar to those described for Alternative 5, with the exception that, in Alternative 7, harvest units are not proposed on the slopes south of the Sitkoh Lake Trail.

The proposed harvest in VCU 245 is minor when compared to the past harvest that has occurred in this VCU. The assigned VQOs and the VQOs that would result under this alternative include modification and maximum modification. This alternative does not meet the assigned VQOs for this VCU because it would shift a greater proportion of the VCU acreage into maximum modification than was planned. The timber to be logged in this VCU is previous blowdown so the impacts associated with its harvest are somewhat diminished. Visual impacts associated with past timber harvest along this area of Peril Strait will continue for the next couple of decades until regeneration softens the harsh contrasts of line, color, and texture.

Cultural Resources



Cultural resource sites within the study area may contain important information on past environmental conditions and lifeways, including information related to environments and cultures along the northern Pacific Rim and possibly the interior of the North American continent. These sites are fragile and nonrenewable. Impacts can include alterations to the setting of sites; alterations of aboveground objects, features, and structures, as well as the spatial relationships among them; and disturbance or destruction of subsurface cultural deposits.

Federal laws and regulations (particularly the National Historic Preservation Act of 1966, as amended; Executive Order 11593; and the American Indian Religious Freedom Act of 1978) require a process, outlined in 36 CFR Part 800, for considering the impacts of Federal projects on cultural resources. In brief, this process involves inventorying the resources, determining which are significant or eligible for inclusion in the National Register of Historic Places, evaluating project impacts, and designing and implementing measures to mitigate the adverse effects that projects may have upon significant resources. The process is undertaken in consultation with the State Historic Preservation Officer (SHPO).

In consultation with the SHPO, the Forest Service has developed a research design that will be applied to the selected alternative. This research design provides a method for evaluating topographic features within the VCUs according to their sensitivity or probability for containing cultural resources. The research design also specifies the percentage of each probability category to be inventoried as well as the methods to be used for cultural resource surveys.

The No Action Alternative (No. 1) would result in no further impacts on cultural resources from APC Long-Term Timber Sale activities through the balance of 1990. In addition to reducing site disturbance or distraction, the No Action Alternative would forego the beneficial effects of scientific study, interpretation, and appreciation of cultural resources.

Table 4-24 provides information on the amount of high probability areas within each VCU along with the amounts of these areas that might be impacted by the action alternatives, and

Table 4-24

Cultural Resource Impacts

VCU	Approximate Acres of High Probability Zone	Known Cultural Resources	Cultural Resources in Area of Potential Impact
235	600	7	1
236	400	7	0
237	600	5	3
238	400	0	0
239	750	5	0
240	500	0	0
241	250	0	0
242	600	2	0
243	1,450	6	1
244	530	1	0
245	80	4	0

SOURCE: SEIS Planning Record.

the numbers of known and potentially impacted cultural resources. Listed sites include Forest Service cabins, logging camps, contemporary cabins, and camp sites which might be considered cultural resources within the next 50 years.

The alternatives under consideration are generally not expected to differ in their impacts on cultural resources. Before logging activities are undertaken in the selected alternative, Forest Service cultural resource specialists will apply a research design to inventory as yet undiscovered cultural resources, evaluate their significance, determine potential project impacts, and design and implement necessary mitigation measures. Such measures could include relocating or redesigning some timber management activities to avoid disturbing cultural resources, protecting sites through the use of barriers, and recovering scientific data or otherwise documenting sites that cannot be avoided or protected. Mitigation measures would be designed to eliminate adverse project effects on significant cultural resources and are set into enforceable contract provisions.

Employment Impacts

A primary reason for selling timber from the Tongass National Forest is to provide for economic development and community stability. The objectives of timber harvest result from specific guidelines furnished through legislation and historic direction related to employment, price stability, economic efficiency, foreign relations, small business, economic growth and development, community stability, and national security (Darr undated).

Since 1980, the Alaska National Interest Conservation Act (ANILCA) and the TLMP have furnished the direction for timber harvest. Section 705 of ANILCA authorizes funding to maintain a harvest level of 4.5 billion board feet per decade. Section 101(d) of ANILCA states the intent of Congress:

“This Act provides sufficient protection for the national interest in scenic, natural, cultural, and environmental values on the public lands in Alaska, and at the same time provides adequate opportunity for satisfaction of the economic and social needs of the State of Alaska and its people; accordingly, the designation and disposition of the public lands in Alaska pursuant to this Act are found to represent a proper balance between

the preservation of national conservation system units and those public lands necessary and appropriate for more intensive use and disposition, and thus Congress believes that the need for future legislation designating new conservation system units, new national conservation areas, or new national recreation areas, has been obviated thereby."

This section addresses the employment and income benefits that are derived from the harvest of timber on the Tongass National Forest and those that would be derived from the alternatives considered for Analysis Area 6 in this SEIS.

Jobs and earnings related to expenditures made by deer hunters and salmon anglers are widely dispersed across Southeast Alaska. Hunters and anglers using the affected area replenish their groceries and gasoline and take some meals in nearby communities, but most of their expenditures for equipment and initial supplies are made in their home community. Table 4-25 reports the employment effects of the alternatives.

Based on a timber supply and demand report for Southeast Alaska (Forest Service 1989b), and estimates derived from the IPASS model (Olson, et al. 1984), Forest Service staff have calculated the average direct and indirect employment related to harvest volume from the Tongass National Forest. The figures include 8.5 jobs/MMBF/year direct and indirect employment. Each job was calculated to be worth an average of \$23,200. Table 4-25 shows the effects of each alternative in jobs and wages. Alternative 1 would maintain no additional jobs and wages as all harvest is expected to be completed by the issuance of ROD. Alternative 5 would maintain the most jobs (956) and salaries (almost \$22.2 million) based on the largest harvest volume. By contrast, Alternative 2 would generate 391 jobs and almost \$9.1 million in salaries.

Since relatively little recreational activity takes place in Analysis Area 6, and since the alternatives would have very little effect on the recreation places, no significant impact is expected on employment and income opportunities in the recreation and tourism industry. Commercial recreation activity in Analysis Area 6 includes guided brown bear and deer hunting and steelhead fishing. Brown bear and deer carrying capacity may be lowered by harvest through the end of the APC Contract, potentially causing outfitters to be displaced. When an outfitter goes out of business, a negative impact results. Displacement of outfitter activities, however, does not denote negative impacts to the analysis area. Although the alternative may result in some outfitters being displaced, none are expected to go out of business as a result of activities proposed through 1990. Therefore, significant impacts to recreation employment are not expected of the action alternatives.

As was mentioned earlier in this chapter, potential impacts on fishery resources are minimal because of the site specific AHMU prescriptions being applied along fish streams and the relatively small amount of fish habitat adjacent to harvest units. Because of this, none of the alternatives are expected to have any affect on income or employment opportunities in the sport or commercial fishing industries or any related economic sectors.

Table 4-25
Jobs and Wages Maintained for Each Alternative

	1	2	3	4	5	6	7
Volume of Harvest (MMBF)	0	46	62	62	113	75	73
Jobs Maintained	0	391	527	527	956	635	620
Value from Wages (Million\$)	0	9.1	12.2	12.2	22.2	14.7	14.3

SOURCE: Timber Supply and Demand, Draft 1988 Report (Forest Service 1989b).

4 Environmental Consequences

Economic Impacts



APC Pulp Plant Loading Dock

The costs of harvesting timber and converting it into marketable forest products are comprised primarily of harvest costs, transportation costs, and manufacturing costs. Those components discussed below are those that can vary from one alternative to another. This section addresses the major components of the costs to the industry of harvesting the timber. This evaluation of costs and benefits provides one basis for comparing the alternatives.

Timber harvest cost estimates are based on the Region 10 Timber Appraisal Handbook (Forest Service 1986e). Base Year 1986 appraisal costs adjusted to the quarter ending June 1988 were used to analyze the SEIS alternatives, using a trial appraisal process. These estimates represent costs an "operator of average efficiency" would be expected to incur. Several factors affect appraisal costs, including species mixture, log grade, net volume/acre, logs/MBF, yarding distance, woods and scaling defect, and percent sideslope. Of these factors, species mixture, log grades, and logs/MBF have the greatest effect on harvesting costs.

The appraisal (harvest) costs for each of the action alternatives are displayed in Table 4-26. Alternative 1, the No Action Alternative, was not appraised as all volume is expected to be harvested prior to implementation of the ROD. Alternative 5 would have the highest total harvesting costs. Alternative 2 would have the lowest total cost followed by Alternatives 4 and 3.

The manufacturing costs (Table 4-26) depend primarily on the total board feet, the species mixture, and the log grade and size. For this analysis, the assumption was used that the species mixture and log grade and size would be the same for all alternatives, since that information only becomes available later in the harvest process.

The three major variables affecting road construction costs are terrain, road standard, and the number of bridges required. Experience has shown that roads constructed in similar terrain will have costs that are similar. Higher road standards may affect road costs by requiring wider roads with flatter grades with the purpose of reducing haul costs. Bridges are relatively expensive and contribute heavily to road construction costs. Alternatives 2 and 3 have the lowest road construction cost per mile primarily because a large proportion of the roads are proposed along the toe of slopes on terrain with sideslopes less than 20 percent and are low standard design. Alternative 4 has the highest unit cost per mile because a larger proportion of these road miles are new construction on steeper terrain.

Road maintenance costs are derived from the amount of timber being hauled, on the road as well as the standard of the road surface. The higher the road standard, the lower the maintenance costs. Alternative 2 has the lowest road maintenance costs per MBF because of the large proportion of high standard road miles.

Log haul costs are a product of the amount of timber hauled, distance hauled and the condition and standard of the haul route. Alternative 2 has the lowest land (truck) haul unit costs per MBF because it has the shortest haul route. Alternative 6 has the highest truck haul costs.

Water tow costs are a product of the amount of timber towed and the distance it is towed, along with the fixed costs of dumping, rafting, and raft storage. Alternative 2 has a lower cost per MBF because Corner Bay has more raft storage room than other log transfer locations.

Table 4-26

Timber Harvest and Manufacturing Costs in Millions of Dollars¹

	Alternative					
	2	3	4	5	6	7
Total Harvest Cost	6.5	8.3	8.2	14.8	9.8	9.9
Manufacturing Cost	13.2	17.8	17.8	32.4	21.6	21.0

SOURCE: Timber Appraisal Handbook, FSH 2409.22 (Forest Service 1986a).

¹ Costs to an Operator of Average Efficiency.

The transportation costs for each alternative are presented in Table 4-27. Alternative 2 results in the least total transportation costs because it would construct the least amount of road for the amount of timber being made available. Alternative 5 would result in the highest total transportation cost, with Alternative 7 being intermediate.

The unit costs (dollars per MBF) for the action alternatives are given in Table 4-28. When harvest, transportation, and manufacturing costs are considered together, Alternative 2 has the lowest total costs per MBF and Alternative 6 has the highest total costs.

Table 4-27
Transportation Costs

Item	Alternative					
	2	3	4	5	6	7
Miles of Road Construction ¹	15.1	27.4	28.4	39.5	38.7	33.6
Thousand Board Feet ¹	46,000	62,000	62,000	112.5	75	73
Road Construction Cost/Mile ¹	171,282	177,157	214,353	187,539	184,775	187,513
<i>Costs</i>						
Road Construction	3,179,160	5,359,428	6,604,715	8,106,349	7,682,912	7,330,024
Road Maintenance	168,070	327,460	420,299	598,443	464,006	375,824
Log Truck Haul	469,230	939,742	1,198,729	1,710,532	1,789,614	1,076,296
Water Tow	570,918	791,098	777,396	1,457,434	992,660	958,209
Log Transfer Facility	0	0	0	0	0	0
Total	4,387,378	7,417,728	9,001,139	11,872,758	10,929,192	9,740,353

SOURCE: Engineers Guide for Estimating Costs of Survey, Design, and Construction of Roads and Bridges. USDA Forest Service, Region 10, Juneau, AK. December 1, 1988.

¹ These values were used to calculate the transportation costs shown.

Table 4-28
Unit Costs (\$ per MBF) for Harvest, Transportation, and Manufacturing

	Alternative					
	2	3	4	5	6	7
Harvest Volume (MMBF) ¹	46.00	62.00	62.00	112.50	73.00	73.00
<i>Costs</i>						
Unit Harvest	141.33	132.26	132.55	131.61	134.97	135.54
Unit Transportation	96.54	121.33	147.34	107.23	151.74	135.07
Unit Manufacturing	287.80	287.80	287.80	287.80	287.80	287.80
Total	525.67	541.39	567.69	526.64	574.33	558.41

SOURCE: Timber Appraisal Handbook, FSH 2409.22 (Forest Service 1986e).

Engineers Guide for Estimating Costs of Survey, Design, and Construction of Roads and Bridges. USDA Forest Service, Region 10, Juneau, AK. December 1988.

¹ These values were used to calculate the unit costs shown.

4 Environmental Consequences

Mail is Hauled from the Float Plane Dock in Teankee Springs



Reasonably Foreseeable, Long-Term, and Cumulative Effects

This section of Chapter 4 addresses the reasonably foreseeable, long-term, and cumulative effects of the alternatives on the environment of Analysis Area 6. The reasonably foreseeable time frame is here interpreted to mean until the end of the APC Long-Term Contract (the year 2011). The long-term time frame is addressed as extending to the end of the first complete harvest rotation (the year 2080). Cumulative effects include the effects of past harvest, existing harvest, adjacent harvest, and harvest proposed under the SEIS alternatives, as well as reasonably foreseeable impacts.

Future harvest projections on National Forest lands were developed using the Multi-Entry Layout Process (MELP) analysis according to the Alaska Regional Guide pages 3-21 and 3-22 (Forest Service 1983a). The MELP documentation used for the 1986-90 FEIS has been updated as a primary data source for this document and is part of the planning record. MELP identifies the commercial forest land, logging systems, and road networks required to manage the timber resources of each VCU in Land Use Designation (LUD) III and LUD IV categories. It also considers high hazard soil conditions, fisheries and wildlife habitat management objectives, and management objectives relating to visual and other resources. In addition, timber harvest markets and potentially uneconomical timber stands were considered.

The long-term and cumulative effects analysis tiers to the Tongass Land Management Plan (TLMP) (Forest Service 1979a), the TLMP amendment (Forest Service, 1986d), and to the FEIS for the 1986-90 Operating Period of the Alaska Pulp Corporation Long-Term Sale Area. It also incorporates information from a Life of Sale Plan for the APC contract prepared in 1982 (Forest Service 1982). The decisions made in TLMP provide long range direction for management of the Tongass National Forest for the duration of the Plan. It is important to remember that Forest Plans are reviewed periodically and revised at least every 10 to 15 years. Decisions made during the revision process can provide for significant changes in management emphasis in any given portion of the National Forest.

The Life of Sale Plan uses the timber output scheduled in TLMP to project the volume range to be harvested in each Operating Period through the end of the APC Contract, the year 2011. MELP does not schedule specific activities within the life of the APC Contract, but projects the TLMP direction through the life of the APC Contract to establish an end baseline for estimating reasonably foreseeable effects. The alternatives considered in this SEIS present various site-specific means of achieving part of the schedule developed in the Life of Sale Plan. The reasonably foreseeable, long-term, and cumulative effects do not depend entirely on the alternatives presented in this SEIS. Rather, they include what may be expected under the direction planned in the TLMP and the Life of Sale Plan, and projected by MELP. The reasonably foreseeable, long-term, and cumulative effects would occur under any of the action alternatives until such time as TLMP is revised.

In the Memorandum and Order from *Tenakee Springs v. Courtright*, the Court indicated that “the EIS should consider, to the extent of foreseeability, the cumulative impacts on the natural environment of a steadily expanding network of logging roads and cutting units.” For the purposes of this document, reasonably foreseeable effects are defined as those effects that can be predicted to occur assuming all APC contractual commitments are met by the year 2011.

The following assumptions were used to assess the reasonably foreseeable effects to the end of the APC Contract. These assumptions reflect current management/technology of National Forests and provide a uniform approach to estimating effects of timber harvest and road construction. Following the assumptions, the reasonably foreseeable, long-term, and cumulative effects on each resource category are discussed. The discussions may supplement and/or summarize the material presented in 1986-90 FEIS.

- The geographical items in the MELP data base are:
 1. the locations of National Forest System land projected for potential harvest over the rotation (operable CFL),
 2. the locations of National Forest System land projected for potential harvest over an extended rotation,
 3. the locations of National Forest System land projected to remain for wildlife,
 4. the locations of National Forest System land that is expected to be economically inefficient to harvest under the timber harvest scheduling scenario that would approximate TLMP guidelines. Decisions have not been made addressing the exact site specific placement of resource objectives.
- There will be three entries into the commercial forest land without an extended rotation.
- Four entries into LUD IV extended rotation areas are planned over a 120-year period.
- Six entries into LUD III extended rotation areas are planned over a 200-year period.
- All roads accessing National Forest Service land to be harvested would be built during the first two entries.
- Laws, Guidelines, and Best Management Practices for resource protection would be followed. These requirements are expected to be at least as stringent in the future as they are today.
- Timber sale planning would occur in an interdisciplinary fashion.
- Second-growth stands within deer winter range would be managed to provide cover and forage.
- All harvest units would be clearcut, except in AHMUs where the clearcut prescriptions may not be employed due to wildlife and habitat protection needs.
- All acres of operable commercial forest land are equally subject to impacts.
- The No Action Alternative would represent only a delay in implementing TLMP, and therefore would have no foreseeable, long-term effects.

Assumptions

4 Environmental Consequences

Vegetation/Timber

The following discussion of reasonably foreseeable, long-term, and cumulative impacts on forest vegetation draws from and supplements pages 4-230 to 4-234 in the APC 1986-90 FEIS (Forest Service 1986b). No further analysis has been conducted since the APC 1986-90 FEIS on long-term and cumulative effects of harvest on second-growth timber or the forest products market for second-growth timber. Discussions of the vegetative changes expected to occur through time on harvested acres, the timber harvest projected through 2011, as well as the operable CFL that would remain, effects on mature and overmature timber stands, and effects of timber harvest from private lands are provided below. The discussion of the vegetative changes through time is especially important since it provides the basis for long term effects on most other resources.

Plant Successional Changes Following Harvest

In areas where harvest occurs, active management will replace natural succession of forest stands. All of the areas proposed for harvest in this SEIS are expected to be managed as even-aged stands. After clearcutting, stands will be restocked within five years, either by managed natural regeneration or by replanting. Where necessary, precommercial thinning will be done by the twentieth year after harvest. Overall, stands will be managed on a 100-year rotation, with the exception of some LUD III and IV lands managed on extended rotations to 160 years and 120 years, respectively.

After replanting, managed forests grow through several distinctive successional stages. Different components dominate the new forest at different stages, and the overall forest structure changes over time as well.

In the first five years of reforestation, the young forest receives maximum sunlight, which results in the rapid establishment of a variety of shrubs, forbs, and grasses. There is little incidence of damage or mortality from disease or infestation at this stage. The changed structure

Old A-Frame Timber Harvest Unit Near False Island



of the young forest affects the structure of adjacent stands; windthrow increases with greater wind exposure, and understory development accelerates due to increased light into the stand.

In years 5 to 20, seedlings grow into a vigorous forest of trees averaging about 19 feet in height and one to three inches diameter at breast height (DBH). Understory production is at its highest at this stage, especially in blueberry-dominated sites. Larger dead materials from the original stand begin to decompose, and the stand edge stabilizes, resulting in less windthrow.

At the end of this successional stage, the new forest may be precommercially thinned, leaving a species composition of about 60 percent western hemlock, 40 percent Sitka spruce, and less than 2 percent cedar.

At an age of 20 to 50 years, tree growth is very rapid, with a gain of about one foot in height per year, and diameter growth of more than five inches every 10 years. Tree crowns begin to grow closer together, while the understory changes from a dense shrub, herb, and seedling-dominated structure to one of dense moss. New forests which have been precommercially thinned will have a two-layered canopy, with hemlock in the lower story. Canopy closure will occur more slowly in precommercially thinned sites.

In years 50 to 80, the canopy remains closed. Little sunlight reaches the forest floor, and the understory continues to be dominated by moss. Tree diameter growth slows to about one inch every ten years, as competition between trees increases. It is not currently economically feasible to precommercially thin stands at this age, but precommercial thinning would increase understory growth and diversity, and would also result in greater tree diameter growth.

In years 80 to 100, the forest becomes mature. Some trees may die, while others become clearly dominant in size. Diameter growth slows to less than one inch every ten years. Moss continues to dominate the understory, except in places where the canopy has opened and allowed sufficient light for herbaceous plants. These structural characteristics continue into the later stages of the stand (100 to 160 years), with continued slow growth and occasional openings in the canopy.

This description does not apply strictly to all sites at all times. Characteristics such as height, diameter, and productivity vary between sites of different quality, or "site classes". However, these successional characteristics would be generally applicable to all units harvested in the Analysis Area. Table 4-29 summarizes the general successional characteristics of managed forest by site class (low, medium, and high site). The proposed harvest by site class for all alternatives in Analysis Area 6 is shown at the beginning of this chapter in Table 4-3.

Projected Timber Harvest through 2011

The MELP was used to project reasonably foreseeable road development and harvest in the Life of Sale Plan. The reason for the EIS projection of harvest to 2011 is to provide information by which to analyze long-term and cumulative effects. Actual harvest units through 2011 would be laid out and analyzed for site-specific impacts in subsequent planning documents.

Table 4-30 shows the cumulative harvest expected for each VCU in Analysis Area 6 by 2011, as well as the percentages of VCU land, CFL, and Operable CFL that would be harvested by 2011. The data show, on average, that 26.7 percent of the CFL would be harvested by 2011. This amount of harvest will affect 15.2 percent of the land area in Analysis Area 6.

The volume available for harvest in the Life of Sale Plan was based on the TLMP aerial photo point inventory data. Stand examinations conducted for the MELP recorded more acreage of Volume Classes 6 and 7 than the TLMP aerial photo point inventory, suggesting that more volume may be present on the acreage scheduled for harvest by the Life of Sale Plan. Until the TLMP is revised, however, this will not be known for sure.

Table 4-29

Average Structural Characteristics of Managed Stands by Site Classification

Stand Age (years)	Height (feet)	DBH (inches)	Volume/Acre (board feet)
<i>Low Site</i>			
5-20	19	1.3	— ¹
20-50	50	5.1	— ¹
50-80	74	7.9	9925
80-100	88	9.6	21500
100-120	100	11.2	35700
120-160	122	14.2	60200
<i>Medium Site</i>			
5-20	19	2.1	— ¹
20-50	59	8.2	— ¹
50-80	93	11.7	24000
80-100	109	13.5	43500
100-120	121	14.9	59500
120-160	137	17.5	82000
<i>High Site</i>			
5-20	19	2.7	— ¹
20-50	72	9.5	— ¹
50-80	107	13.2	42500
80-100	123	15.1	63200
100-120	134	16.8	77100
120-160	151	19.7	102395

¹ Average volume data not available for stands of 5 to 50 years.

Mature and Overmature Timber

All timber on National Forest lands proposed for harvest in the action alternatives are mature or overmature and are well beyond the point of culmination of MAI or the age of maximum average annual growth of the stand. They are representative of uneven-aged western hemlock stands that commonly take hundreds of years to develop under natural conditions if they are not manipulated by intensive forest management practices or changed by natural events such as windthrow.

The environmental consequences of converting mature and overmature forest stands to an earlier successional stage involves many complex interactions, including many ecological changes that affect physical, biological, and social systems. These successional changes are difficult to quantify because of the complexity of forest succession, the amount of site and stand variability, the difficulty of quantifying social values resulting from change, and the lack of intensive research about forest succession in Southeast Alaska.

Table 4-30

Foreseeable and Long-term Timber Harvest by 2011

VCU	Cumulative Harvest (acres)	Percent Operable CFL	Percent CFL	Percent Land
235	2,618	15.5	14.7	7.8
236	2,535	35.4	34.9	23.0
237	842	21.6	18.8	12.7
238	1,234	30.0	23.2	12.4
239	1,788	22.9	21.3	10.3
240	932	27.9	23.4	9.8
241	1,423	49.0	40.9	18.6
242	1,958	25.6	25.1	17.3
243	4,537	32.0	29.0	16.4
244	2,457	42.4	39.5	20.7
245	5,543	34.1	33.9	23.3
Total	25,867	28.7	26.7	15.2

SOURCE: SEIS Planning Record.

Second-Growth Stands

The open conditions created in clearcuts allow both Sitka spruce and western hemlock to regenerate rapidly. Even-aged stands usually contain from 10 to 75 percent spruce depending on the soil type and the age of the stand. On average, the volume of spruce in even-aged stands 75 to 100 years after harvest is about 50 percent (Taylor 1934) compared to 28 percent in existing mature and overmature stands. With the use of silvicultural practices such as pre-commercial thinning, an additional 10 percent or more increase in the spruce component is expected.

Although log quality in second-growth stands is expected to be lower than in mature and overmature stands, even on sites that have been precommercially thinned, total yield per acre is expected to be higher in second-growth stands. The lower quality will be reflected in the log grades (sizes), with second-growth timber stands having fewer higher grade logs than existing mature and overmature stands. In addition, second-growth stands will have less volume in the larger diameter classes. Nevertheless, total yield per acre will be significantly greater in second-growth stands than in mature and overmature stands. The long-term results of precommercial thinning is the production of more usable fiber. Precommercial thinning also allows the Forest Service the option of reducing the rotation age because merchantable size logs are produced sooner on thinned sites than in areas not thinned.

Most second-growth stands will exhibit less variation in tree diameter and height than the mature and overmature stands they replace. For unmanaged second-growth stands average diameters will range from 10.5 inches on the poorer sites (site index 85) to 17.2 inches on the best sites at 100 years of age (site index 140) (Taylor 1934). With several precommercial thinnings it is possible to produce average stand diameters that approximate old-growth averages. On the better sites average diameters of 20 to 21 inches are possible in 100 to 110 years (Forest Service 1986c).

4 Environmental Consequences

Transportation

Through the end of the APC Long-Term Contract in year 2011, the only log transfer facilities expected to be used in conjunction with operations in Analysis Area 6 are the existing ones at Corner Bay, Sitkoh Bay, False Island, and Todd Cannery. Since several of these log transfer facilities have been inactive for considerable periods of time major reconstruction may be necessary to bring them back to an operational condition. The logging camp at Corner Bay will continue to be used. Its use is expected to be continuous and year-round. The logging camp at False Island will be reactivated under most of the action alternatives. Its use is expected to be year-round and continuous for about three years and intermittent after that.

Forest roads are classified in relation to their service life as either short-term (10 years or less design life) or as long-term (20 years and greater).

Short-term or temporary roads are developed and operated for a limited time period and cease to exist as a transportation facility after the purpose for which they were constructed is completed. When the use of these roads has ended, they are obliterated and reclaimed for natural resource management and for erosion control. The timber purchaser is responsible for obliteration, which may be accomplished through natural revegetation. These roads are not included in the forest development road inventory.

*Recently Constructed Road
Near Kook Lake*



Long-term or forest development roads are developed and operated for long-term land management and resource utilization needs. They are constructed either under the terms of the timber sale contract or under a formal road construction contract. All the tables, charts and graphs in this document that display road miles feature only these forest development roads. Figure 4-1 is a 1978 view of a long term transportation system for the Tongass National Forest. This long term projection was updated for scheduled roads during the 1985-86 TLMP Amendment. The 1978 projected system may appear to be nonresponsive to current issues such as a road connecting Hoonah to Tenakee Springs (H. R. 987). The EIS and ROD for projects such as this Supplement provide the responsible official an opportunity to address current transportation issues.

The environmental consequences from forest development roads can be compared in terms of road density and acres of forest removed from natural resource production by roadway clearing widths. Road density is defined by the number of miles of forest development road in a square mile. Generally, the higher the road density, the higher the risk of environmental impacts. Road density environmental impact risks are minimized and mitigated by standards and guidelines which direct the road location, design, construction and operation. Tables 4-31 and 4-32 display current road densities, projected road densities by alternative and road densities through the foreseeable future for each VCU in Analysis Area 6.

The clearing widths required for forest road development are dictated by the steepness of the terrain and the road design standard. Steeper terrain with high design standards generally require wider clearing limits resulting in a greater number of acres cleared. Clearing limits can be modified, within the limits of driver safety, when the road parallels fish streams and beaches. Table 4-33 compares road clearing acres in each VCU by alternative.

4 Environmental Consequences

Figure 4-1

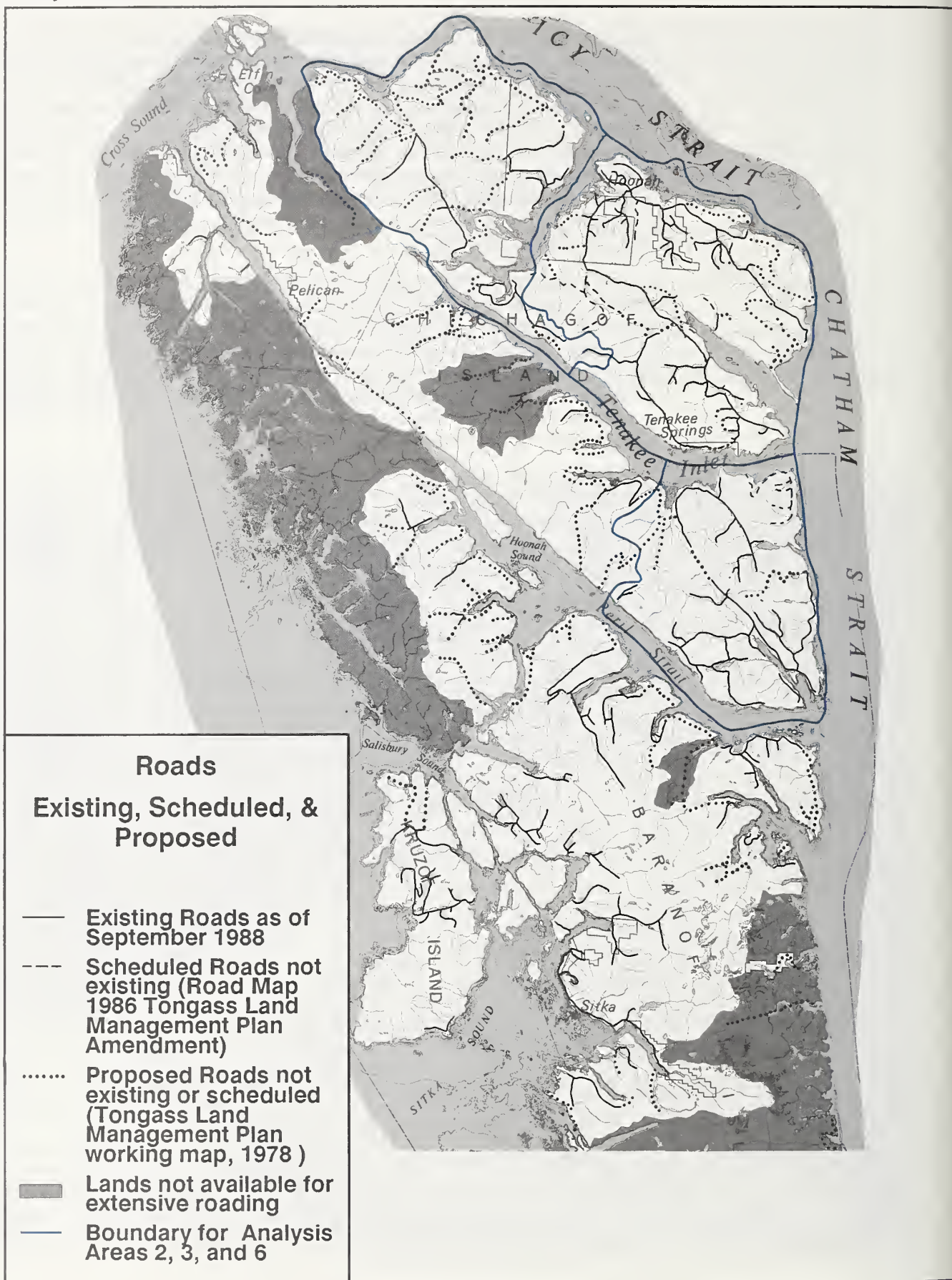


Table 4-31

Proposed Road Construction and Road Density

VCU	Existing ¹	Alternative					
		2	3	4	5	6	7
<i>Miles of Road</i>							
235	5.6	0	0	3.5	1.0	11.2	0
236	14.8	4.3	4.3	0	0	0.5	2.1
237	0	0	0	6.0	6.0	6.0	6.0
238	0	0	46.5	16.5	16.5	16.5	11.3
239	17.5	0.8	0.8	0	0.8	0	4.2
240	0.4	0	0	0	0	0	0
241	8.5	0	0	0	3.6	0	0
242	15.6	3.3	3.3	3.3	6.6	0	3.3
243	32.6	8.8	8.8	9.6	0.7	5.9	7.3
244	17.2	0	0	0	7.5	0	2.1
245	29.2	0	0	0	0	0	0
Total	141.4	17.2	63.7	38.9	42.7	40.1	36.3
<i>Road Density²</i>							
235	0.11	0	0	0.07	0.02	0	0
236	0.86	0.25	0.25	0	0	0.18	0.12
237	0	0	0	0.58	0.58	0.58	0.58
238	0	0	1.06	1.06	1.06	1.06	0.73
239	0.64	0.03	0.03	0	0.03	0	0.15
240	0.03	0	0	0	0	0	0
241	0.71	0	0	0	0.30	0	0
242	0.88	0.19	0.19	0.19	0.37	0	0.19
243	0.75	0.20	0.16	0.22	0.20	0.14	0.17
244	0.92	0	0	0	0.40	0	0.11
245	0.78	0	0	0	0	0	0
Total	5.68	0.67	1.69	2.12	2.96	1.96	2.05

SOURCE: SEIS Planning Record

¹ Existing road miles included roads authorized by the Alaska Federal District Court in the non-deferred VCU's.

² Road density is defined as the miles of road per square mile.

4-32

Projected Road Construction (Miles) and Road Density Through 2011

VCU	Existing Roads ¹	Projected New Construction	Total Projected Roads	Road Density
235	5.6	37.5	43.1	0.82
236	14.8	9.9	24.7	1.44
237	0	8.5	8.5	0.82
238	0	16.5	16.5	1.06
239	17.5	13.5	31.0	1.14
240	0.4	6.6	7.0	0.47
241	8.5	4.5	13.0	1.09
242	15.6	11.5	27.1	1.53
243	32.6	23.4	56.0	1.29
244	17.2	10.5	27.7	1.49
245	29.2	3.7	32.9	0.88
Total	141.4	146.1	287.5	1.08

SOURCE: SEIS Planning Record

¹ Existing road miles include roads authorized by the Alaska Federal District court in non-deferred VCU's

² Road Density is defined as the miles of road per square mile.

Table 4-33

Clearing Requirement for Road Development (Acres)

VCU	Alternative					
	2	3	4	5	6	7
235	0	0	22	6	71	0
236	27	27	0	0	3	13
237	0	0	38	38	38	38
238	0	104	104	104	104	71
239	5	5	0	5	0	26
240	3	0	0	0	0	0
241	0	0	0	23	0	0
242	21	21	21	42	0	21
243	55	44	60	4	37	46
244	0	0	0	47	0	13
245	0	0	0	0	0	0
Total	111	201	245	269	253	228

SOURCE: SEIS Planning Record

Wildlife

Although the proposed alternatives would have no major effect on wildlife, it is important to note the potential long-term effects. Once new roads have been constructed into a previously unharvested watershed, their use is likely to continue in the future. The resulting activity could reduce wildlife populations or wildlife use of the habitats due to additional access for hunters, pressure to use the watershed for recreation activities, and re-entry for timber harvesting. Road management mitigation measures, discussed below under mitigation, would be employed to reduce these impacts.

The primary long-term impacts on wildlife result from changes in habitats. Therefore, the reasonably foreseeable effects to the end of the APC Long-Term Timber Sale (year 2011) were estimated by calculating the acres of each VCU that would be harvested up to that date. Amounts of habitat projected to be harvested were used to evaluate effects on emphasis species.

The location and amount of timber harvest acreage and the resulting effect on wildlife habitats were projected for the 100-year rotation ending in the year 2080 in the 1986-90 FEIS (Forest Service 1986b, page 4-247). For this supplemental analysis, reasonably foreseeable effects were calculated until the end of the long-term timber sale (2011). Consequently, the effects on wildlife habitats were proportionally reduced from the estimates presented in the 1986-90 FEIS. This method was used because the precise location of the timber harvest within the VCUs to the end of the sale has not been determined. The estimated acreage and percent of unaffected wildlife habitat remaining after timber harvest activities through 2011 is displayed in Table 4-34.

Wildlife Habitats

It is estimated that 79 percent of the forested habitat in Analysis Area 6 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected forest habitat remaining by VCU varies from 59 percent in VCU 236 to 95 percent in VCU 237. The 21 percent of forested habitat affected would be in various stages of forest succession following timber harvest. These areas would provide varying wildlife habitat values as the forest matures. Timber harvest increases the number of forage areas and forage production due to sprouting vegetation. This would be a temporary condition however, because the forest canopy closes with increased tree growth. As the canopy closes and matures, the hiding and thermal cover values increase. Precommercial thinning helps to balance the forage and cover values. In varying degrees, changing habitat values due to forest succession, will affect the habitats and species discussed below.

Deer Winter Range

Implementation of either action alternative would reduce deer winter range by as little as 21 acres in Alternative 2 to 1468 acres in Alternative 5. The percent of acres remaining following the 1990 operating period would range from 77 percent in alternative 5 to 80 percent in Alternative 2 (see Tables 4-6 and 4-7 for reductions by VCU).

It is estimated that 75 percent of the deer winter range in Analysis Area 6 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected deer winter range that would remain varies from 37 percent in VCU 241 to 100 percent in VCUs 240 and 244. The affected 25 percent would undergo forest succession and the associated changes in habitat values as mentioned above.

Inland Wetland

There are no inland wetlands proposed for harvest in any of the action alternatives and eighty percent of inland wetlands would remain after the 1990 operating period.

An estimated 80 percent of the inland wetland habitat in Analysis Area 6 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected inland wetland habitat that would remain varies from 61 percent in VCU 235 to 100 percent in VCUs 240, 241, and 245.

4 Environmental Consequences

Beach Fringe

Only 5 acres of beach fringe habitat would be altered by the proposed harvest in Alternatives 5 and 6. Eighty to 81 percent of the beach fringe habitat would remain after the 1990 operating period.

Eighty-one percent of the beach fringe habitat in Analysis Area 6 is estimated to remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected beach fringe habitat that would remain varies from 56 percent in VCU 241 to 100 percent in VCUs 235, 240, and 244.

Table 4-34

Wildlife Habitats Remaining After Projected Harvest Through 2011

VCU	Forested	Deer Winter Range	Inland Wetland	Beach Fringe	Estuarine Fringe	Streamside Riparian
<i>Acres Remaining</i>						
235	24,288	2,771	62	455	690	1,613
236	5,078	1,396	12	206	190	175
237	4,348	1,272	44	541	186	112
238	5,703	1,065	— ¹	335	61	619
239	9,379	1,451	232	565	15	377
240	6,071	160	148	116	120	1,012
241	4,182	370	155	200	— ¹	453
242	6,520	1,555	— ¹	387	60	289
243	15,077	2,043	— ¹	417	128	350
244	7,856	70	211	36	— ¹	565
245	14,031	3,032	26	1,353	60	258
Total	102,533	15,185	890	4,611	1,510	5,823
<i>Percent Remaining</i>						
235	89	88	61	100	99	83
236	59	84	80	67	76	50
237	95	98	66	99	98	93
238	90	95	— ¹	97	100	85
239	75	76	88	94	50	62
240	87	100	100	100	100	93
241	75	37	100	56	— ¹	92
242	77	81	— ¹	91	100	94
243	77	61	— ¹	58	40	60
244	76	100	63	100	— ¹	65
245	72	67	100	76	30	24
Total ²	79	75	80	81	78	71

SOURCE: SEIS Planning Record.

¹ None of this habitat was found in the inventory.

² This value represents the percent of pre-harvest habitat remaining in the entire analysis area.

Estuarine Fringe

No estuarine fringe is proposed for harvest under any alternatives and 79 percent of the habitat would remain after the 1990 operating period.

It is estimated that 78 percent of the estuarine fringe habitat in Analysis Area 6 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected estuarine fringe habitat that would remain varies from 30 percent in VCU 245 to 100 percent in VCUs 238, 240, and 242.

Streamside Riparian

A minor amount of streamside riparian habitat is located in the proposed harvest units. Fifty-five to 135 acres would be affected in Alternatives 3 through 7 leaving 77 to 78 percent after the 1990 operating period (see Tables 4-10 and 4-11 for acres reduction by VCU).

It is estimated that 71 percent of the streamside riparian habitat in Analysis Area 6 would remain unaffected by timber harvest activities through 2011 (Table 4-34). The percent of unaffected streamside riparian habitat that would remain varies from 24 percent in VCU 245 to 94 percent in VCU 242.

Old-Growth Conditions

The greatest impact to old-growth habitat would occur under Alternative 5. A high of 950 acres would be harvested under this alternative, while Alternatives 2, 3 and 4 would impact no old-growth habitat through the 1990 operating period (see Table 4-12 for acre reduction by VCU).

Future long-term prescriptions for old-growth habitat conditions will be considered in a revision of the Tongass Land Management Plan, which is currently in progress.

Wildlife Species

Sitka Black-tailed Deer

The habitat capability model used to project the effects of harvest through 1990 suggests less than 3.4 percent reduction in deer numbers under all alternatives. This estimate reflects a potential reduction of deer ranging from 46 animals under Alternative 2, to 159 under Alternative 5, from an estimated population of over 4,050 deer (see Table 4-13 and 4-14 for a complete analyses by VCU and minor harvest area).

Due to second growth closing in past clearcut areas, Alternative 1 (no action) would result in potential deer numbers being reduced to 84 percent of the 1961 level by 2015 and remaining at that level to 2080 (Figure 4-2). Alternative 6 proposes the most timber harvest in Analysis Area 6 and would result in the greatest impact on deer habitat capability. Proposed timber harvest activities and second growth closure effects would result in potential deer numbers at 80 percent of the 1961 level by 2015 and 79 percent by 2080.

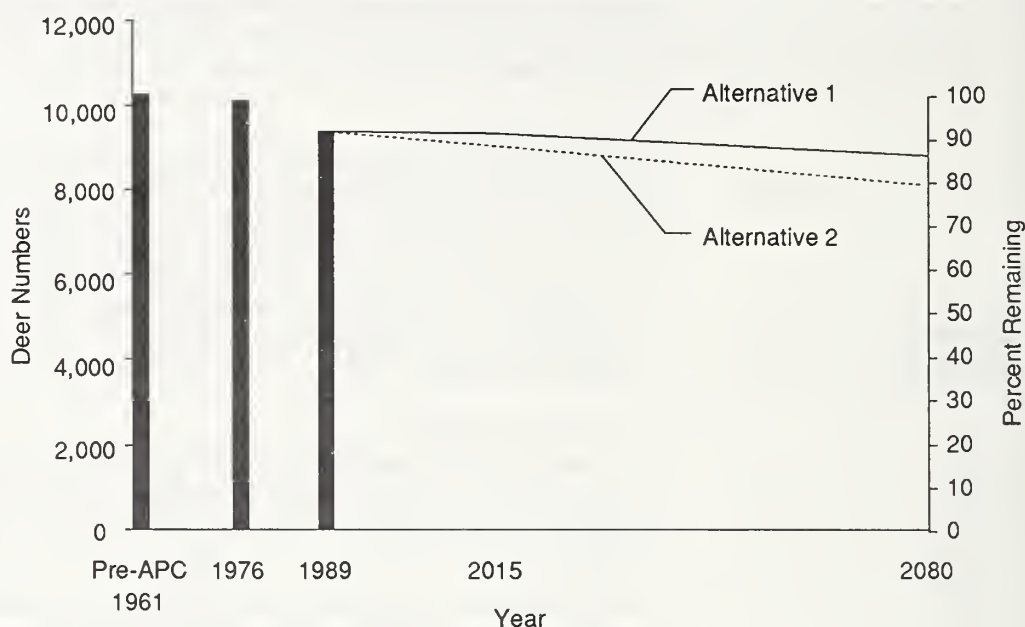
It is estimated that 79 percent of the forested habitat and 75 percent of deer winter range would remain unaffected by timber harvest activities through 2011 (Table 4-34). The resulting change in those habitats would probably lead to a reduced carrying capacity for the black-tailed deer. The habitat capability model information indicates that projected timber harvest would reduce potential deer numbers to 77 percent of their 1961 level by 2011 and 63 percent by 2080 (Figure 4-3).

Brown Bear

Little harvest of important brown bear habitat is proposed in the current operating period. None of the alternatives propose harvest in estuary fringe and a maximum of 5 acres of beach fringe are proposed for harvest, both of which are important habitats for brown bear. Five alternatives harvest in stream riparian areas with 77 to 78 percent of this habitat remaining at the end of the 1990 operating period.

Figure 4-2

Project Specific Effects on Projected Black-tailed Deer Habitat Capability Through One Timber Crop Rotation



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record).

Figure 4-3

Comparison of Projected Black-tailed Deer Habitat Capability Through One Timber Crop Rotation



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record).

Due to second growth closing in past clearcut areas and road density levels, Alternative 1 (no action) would result in potential brown bear numbers being reduced to 62 percent of the 1961 level by 2015 (Figure 4-4). No additional reduction in numbers is expected and the population level should remain stable to 2080. Alternative 6 proposes the most timber harvest in Analysis Area 6 and would result in the greatest impact on brown bear habitat capability. Proposed timber harvest activities, second growth closure effects, and open roads would result in potential brown bear numbers at 49 percent of the 1961 level by 2015 and the same to 2080.

Timber harvest effects on the brown bear are not expected to be substantial. Their high use of streamside riparian, estuarine fringe, and beach fringe habitats indicate the importance of these areas to brown bears. The levels of harvest should give a relative indication of the cumulative effects on these animals. It is estimated that after the projected harvest by 2011 these habitats would remain at 75 to 95 percent of the original amounts in most VCUs (Table 4-34).

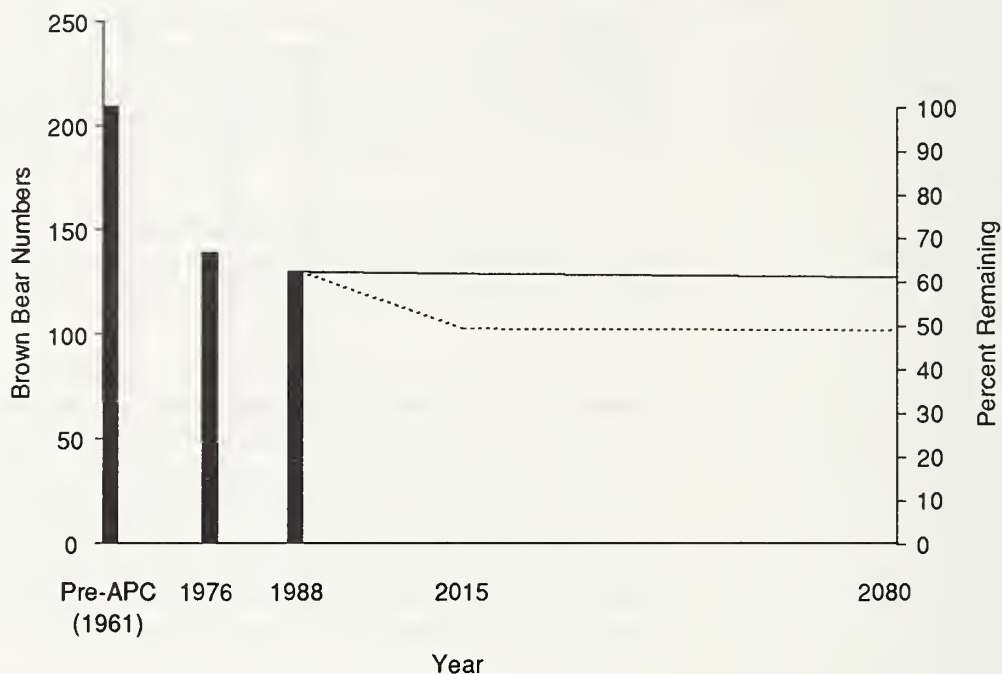
The habitat capability model information indicates that long-term timber harvest (projected by MELP and TLMP) effects would reduce potential brown bear numbers (Figure 4-5). Brown bear habitat capability by 2011 is estimated at 35 percent of the 1961 level, and 33 percent by 2080.

If any road closure management options were implemented as discussed in the Mitigation section of Chapter 4, brown bear habitat capability numbers would show long-term improvement. Figures 4-4 and 4-5 illustrate the positive change on brown bear numbers resulting from the proposed road management options. As noted in the earlier impacts discussion, reduction of brown bear kills would be immediately realized due to closure of newly constructed roads. For those roads already constructed and providing access to back country areas, the positive effect of road closure would take more time. The lower illustration (Figures 4-4 and 4-5) that shows brown bear numbers under the road closure options, indicates this long-term positive effect by 2011 and further on to 2080.

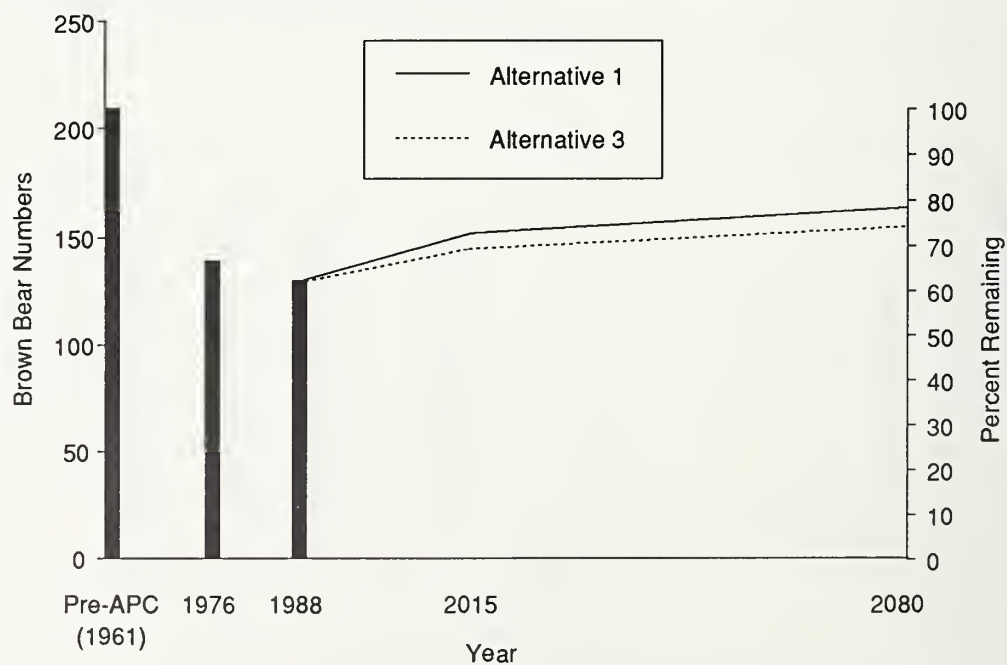
Figure 4-4

Project Specific Effects on Projected Brown Bear Habitat Capability Through One Timber Crop Rotation

Without Road Management Options



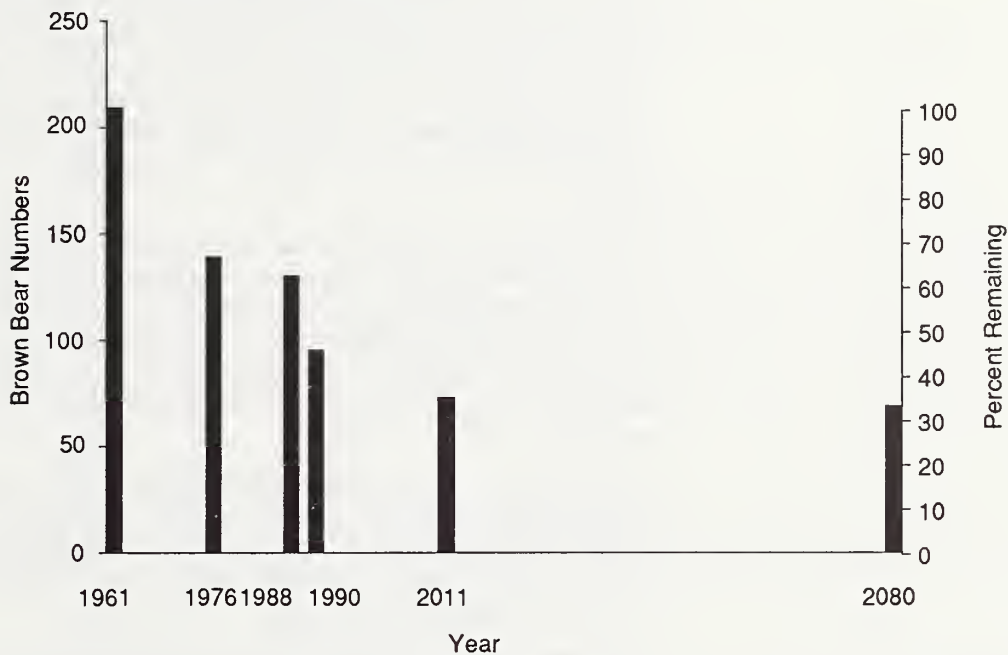
With Road Management Options



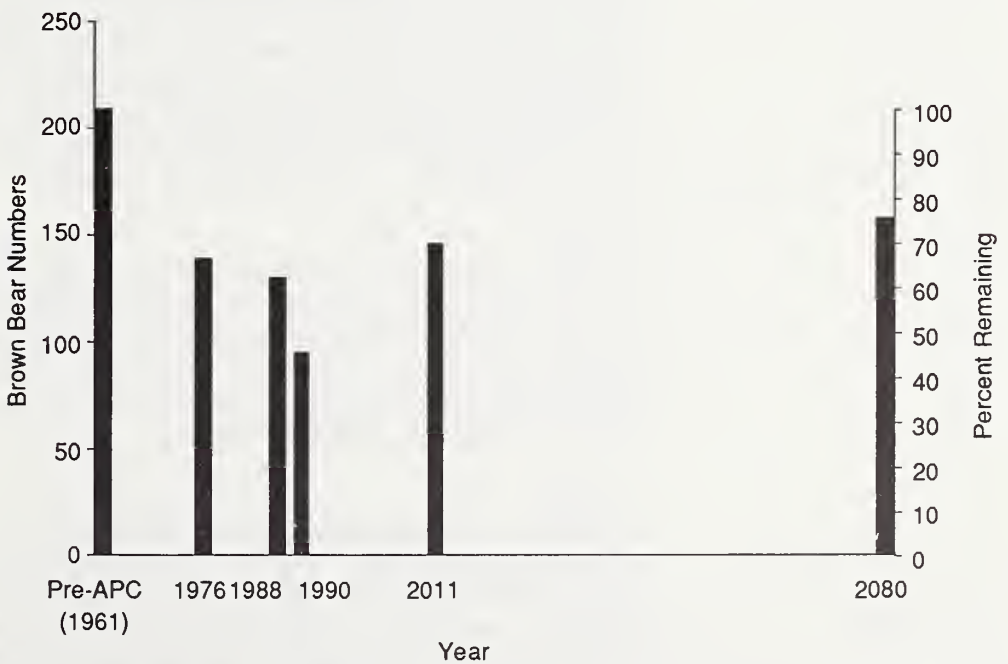
Source: Forest Service in consultation with ADF&G (SEIS Planning Record).

Figure 4-5
Comparison of Potential Brown Bear Habitat Capability Through One Timber Crop Rotation¹

Without Road Management Options



With Road Management Options



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning record).
¹ Includes effects due to projected harvest under MELP and TLMP.

Pine Marten

The pine marten habitat model, used to analyze the proposed harvest through 1990, indicated that less than 67.9 percent reduction in pine marten numbers could be expected. This estimate reflects a potential reduction of 2 pine martens under Alternative 2 and 79 pine martens under Alternative 5.

Due to second growth closing in past clearcut areas and road density levels, Alternative 1 (No Action) would result in potential pine marten numbers being reduced to 55 percent of the 1961 level by 2015 (Figure 4-6). No additional reduction in numbers is expected and the population level should remain stable to 2080. Alternative 6 proposes the most timber harvest in Analysis Area 6 and would result in the greatest impact on pine marten habitat capability. Proposed timber harvest activities, second growth closure effects, and open roads would result in potential pine marten numbers at 37 percent of the 1961 level by 2015 and the same to 2080.

It is estimated that 79 percent of the forested habitat would remain unaffected by timber harvest activities through 2011 (Table 4-34). The habitat reduction associated with timber harvest would probably lead to a proportional reduction in carrying capacity for the pine marten. The habitat capability model information indicates that long-term timber harvest (projected MELP and TLMP) effects would reduce potential pine marten numbers (Figure 4-7). Pine marten habitat capability by 2011 is estimated at 11 percent of the 1961 level, and 11 percent by 2080.

Carrying capacity for the marten should increase again as regenerated forests in harvest units mature through the rotation. However, it is not expected that a stand will return to the carrying capacity for martens of the existing stand while managed on a 100-year rotation. Carrying capacity of the post-harvest stand may also be improved through implementation of the second-growth management program.

If any road closure management options were implemented as discussed in the Mitigation section of Chapter 4, pine marten habitat capability numbers would show long-term improvement. Figures 4-6 and 4-7 illustrate the positive change on pine marten numbers resulting from the proposed road management options. As noted in the earlier impacts discussion, reduction of pine marten trapping would be immediately realized due to closure of newly constructed roads. For those roads already constructed and providing access to back country areas, the positive effect of road closure would take more time. The lower illustration (Figures 4-6 and 4-7) that shows pine marten numbers under the road closure options, indicates this long-term positive effect by 2011 and further on to 2080.

Land Otter

Land otters generally occur in close proximity to the beach (Larsen 1983 and Woolington 1984) within areas identified as beach fringe habitat for the 1986-90 FEIS. It is estimated that 81 percent of the beach fringe habitat would remain unaffected by timber harvest activities through 2011 (Table 4-34). It should be noted that many harvest units within the beach fringe habitat have buffers left between the harvest unit and the beach. These measures should result in only small reductions of land otters by 2011.

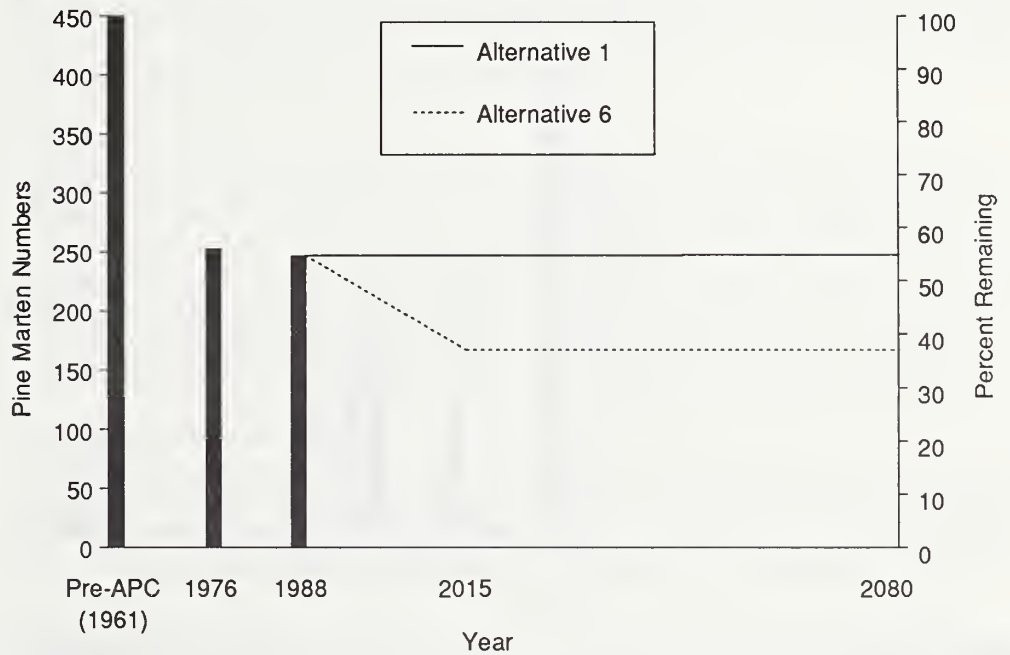
Bald Eagle

It is estimated that the buffer zone of some additional eagle nest trees could be infringed upon by timber harvest activities to 2011. These infringements will be dealt with under a Memorandum of Understanding between the Forest Service and US Fish and Wildlife Service to assure that they would have no effect on carrying capacity for bald eagles (Forest Service 1984). Normal procedure is not to harvest near known nest trees. Harvest in beach fringe or estuarine fringe will proportionally reduce the capacity of the habitat to produce future nest trees.

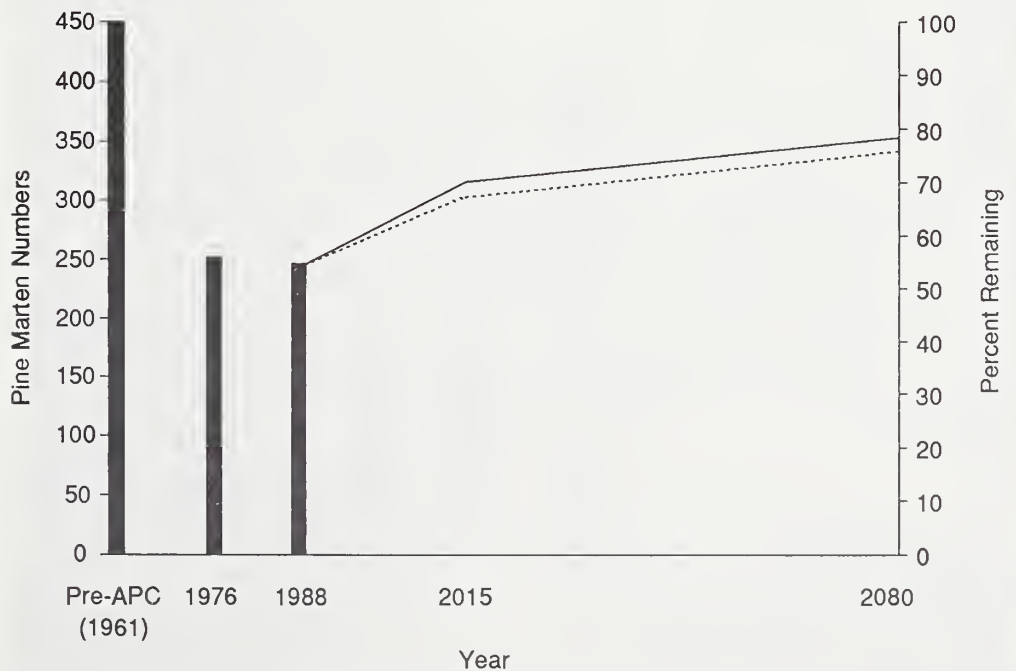
Figure 4-6

Project Specific Effects on Projected Pine Marten Habitat Capability Through One Timber Crop Rotation

Without Road Management Options



With Road Management Options

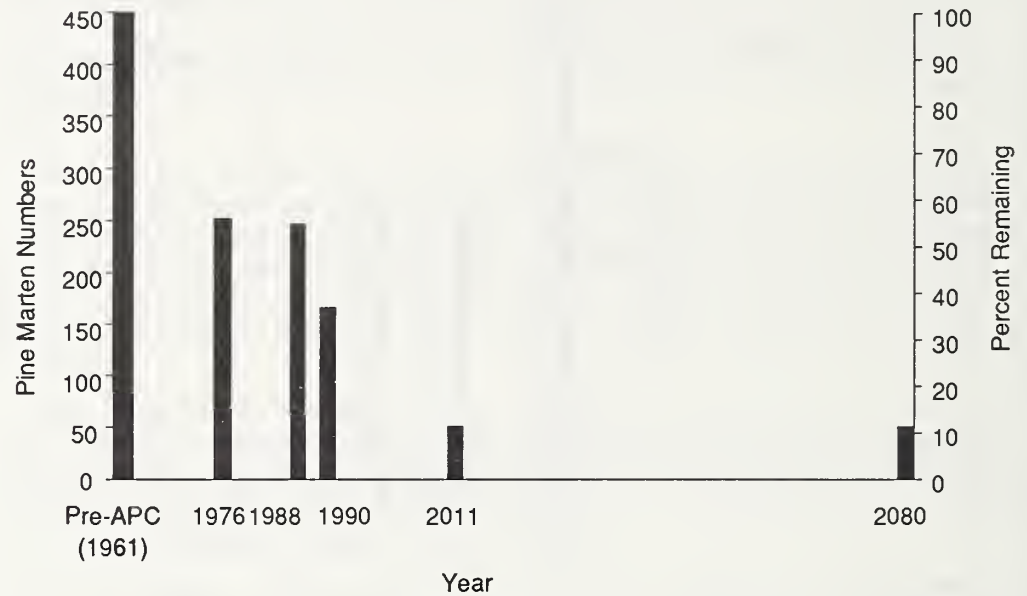


Source: Forest Service in consultation with ADF&G (SEIS Planning Record).

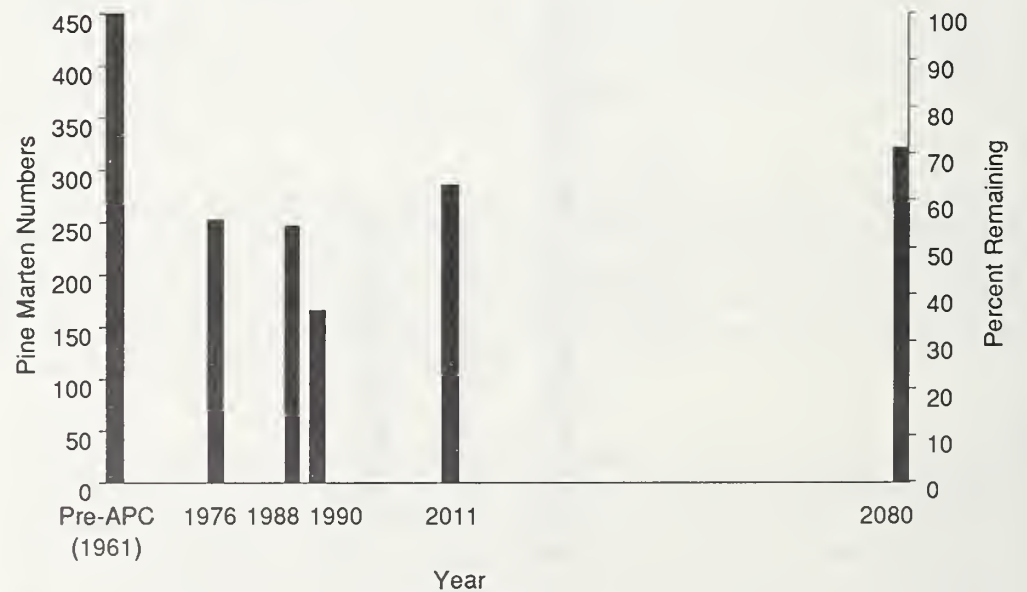
Figure 4-7

Comparison of Projected Pine Marten Habitat Capability Through One Timber Crop Rotation¹

Without Road Management Options



With Road Management Options



SOURCE: Forest Service in consultation with ADF&G (SEIS Planning Record).

¹ Includes effects due to projected harvest under MELP and TLMP.

Vancouver Canada Goose

Vancouver Canada geese nest in inland wetland, estuarine fringe, and forested habitats. Within these habitats they often select noncommercial or low-volume forested sites. Harvest of these habitats could affect Vancouver Canada geese. It is estimated that 80 percent of the inland wetland, 78 percent of the estuarine fringe, and 79 percent of the forested habitats would remain unaffected by timber harvest activities through 2011 (Table 4-34). These levels of estimated timber harvest could reduce the carrying capacity for geese in Analysis Area 6. However, it is anticipated that the amount of reduction in carrying capacity would be small, and probably not proportional to the reduction in habitat as Vancouver Canada geese are probably not limited by the abundance of nesting habitats.

Fisheries/Hydrology

To understand the general changes in watershed and stream conditions, and their affect on fisheries 30 to 50 years following timber harvest, it is useful to address two types of watersheds: upland channels or mountainslope ravines, and lowland channels. Upland channels include mostly Class III AHMUs where the primary management objective is to protect water quality. These streams have little or no resident fish habitat. Lowland channels are primarily low gradient floodplain channels and moderate to low gradient alluvial fan and footslope channels. Lowland channels fall within the Class I and II AHMU categories where the primary management objective is to protect important anadromous and resident fish habitat.

Changes to Upland Streams

Roads corridors frequently cross upland Class III channels. Erosion and sedimentation from channel disturbance associated with construction of stream crossing structures and road use and maintenance could be expected to result in small increases in sediment input and transport. The majority of increased erosion occurs over a period of 2 to 5 years following con-

Kadashan River, an Important Salmon Spawning Stream



struction. Short-term (1 to 2 days) water quality degradation near construction activity is likely. However, the likelihood of long-term impacts to downstream water quality (sediment or turbidity) or stream channel stability is generally low.

Large organic debris (LOD) is important in some, but not all, upland Class III streams. Clearcut harvesting along upland Class III channels would reduce large woody debris recruitment, thus reducing instream log step pools over time in some streams. Sediment storage capacity may be reduced, potentially resulting in more rapid routing of bedload sediment to downstream areas. The cumulative effects of changes in coarse sediment routing are unknown.

Upper bank erosion within upland v-notch channels may increase slightly following harvest due to windthrow of ravine timber. Increases in sediment delivery from upland channels would occur but should remain within the natural range of sediment discharge based on the results from sediment transport monitoring following timber harvest in a typical Southeast Alaska watershed.

Future road construction and timber harvesting activities might increase the risk for mass wasting events such as debris torrents in Class III channels and debris avalanches from unstable mountain sideslopes. Although only a small percentage of natural and management induced mass wasting directly impact fish streams, accelerated erosion and sedimentation from management activities would likely result in some localized degradation of spawning gravels and fish rearing habitat.

Changes to Lowland Streams

The implementation of riparian management prescriptions would substantially limit the amount of streamside harvest activity on Class I anadromous fish streams and Class II resident fish streams. This management approach should result in minimal changes to stream morphology and fish habitat condition. Riparian harvesting prescriptions are designed to minimize impacts related to streambank disturbance, canopy alteration, and large organic debris recruitment.

Proposed harvest by channel type for all action alternatives in Analysis Area 6 are displayed at the beginning of this chapter in Table 4-21. The locations of upland and lowland channels may be found in the Unit Cards (Appendix A-1).

Large Organic Debris/Channel Stability - Fish Habitat

Large organic debris, which is generally considered to be stable woody material at least 10 centimeters in diameter and 1 meter in length intruding into the stream (AHMU Handbook), is a key component for the maintenance of channel stability and for providing fish habitat in streams of Southeast Alaska. Recent research (i.e., Murphy, et al. 1986, 1987, Heifetz, et al. 1986, Bryant 1980, 1983) has demonstrated the importance of large organic debris for providing a diverse channel morphology, for maintaining channel stability, and for providing cover and refuge habitat for fish. Large organic debris declines over time and must be replaced by new inputs from streamside timber. Impacts of large organic debris should balance the natural depletion rate, otherwise debris dependent habitat will be impacted.

In order to provide a source for future recruitment of large organic debris, the harvest and regeneration of streamside trees needs to be carefully managed. Prescribed streamside management techniques employed on National Forest lands throughout the SEIS operating period are expected to maintain instream and future sources of large organic debris, thus preventing degradation of channel stability. These measures should maintain fish production, however, the long-term consequences of active streamside management for large organic debris and channel stability have not been measured. Projections made by Sedell and Swanson (1984) based on their model of a managed stream system indicates that fish production from managed streamside zones could potentially be increased, over a 120-year harvest cycle. Active

streamside management increases fish biomass by providing openings in the canopy, which improves primary and secondary production, and by maintaining input of large organic debris that creates and maintains habitat. (Sedell and Swanson 1984).

The assumptions utilized in the long-term projection of timber harvest for the 1986-90 study area includes not harvesting 80 percent of the trees within 100 feet on either side of Class I and II streams and 40 percent of Class III streams on a watershed on National Forest lands. (This assumption has been carried through to the end of the contract and harvest rotation periods, 2011 and 2088, respectively). The intent is to ensure that streamside trees of suitable size and length will be available through the rotation to provide sufficient future sources of large organic debris and to maintain channel stability. The proposed 20 percent harvest in conjunction with a second-growth thinning program for past harvest units where second growth or alder is shading the stream will ensure that light penetration will be available to fuel potential increases in fish biomass. The results of this program would, at the minimum, maintain the current production, and may lead to sustained increased production.

Stream Temperature

Thermal impacts (from elevated water temperature) are not anticipated during the first harvest rotation (100 years) as a result of timber harvest. Aquatic Habitat Management Unit streamside timber guidelines anticipate at least 80 percent of the trees within 100 feet of streams will remain standing at the end of the rotation. Application of the standards and guidelines would provide adequate streamside vegetation to eliminate potential stream temperature impacts.

A current aquatic research hypothesis speculates that increased winter temperature caused by timber harvest in Southeast Alaska may cause early emergence of fry from spawning gravels (Elliot 1985, unpublished, Schwan, et al. 1985). Early emergence could cause pink and chum fry to encounter a reduced food supply in estuaries and/or washout of coho fry during the spring runoff. Elevated winter temperature and sufficient overwinter habitat could lead to a longer growing season for coho fry and juveniles yielding more smolts that may increase adult returns (Schwan, et al. 1985). This is similar to the hypothesis presented by Sedell and Swanson (1984) in their discussion of active streamside management. A long-term watershed evaluation program specifically keyed to winter temperature conditions and the effects of timber harvest would be necessary to sort out the correct conclusion. The current assumption is that at least 80 percent of the timber volume within 100 feet of streams standing at the end of the rotation, thus minimizing winter temperature effects and potential detrimental impacts on fish resources.

Nutrient Cycling

Available scientific evidence indicates that some soluble nutrients are tightly bound in soil humus layers. Timber harvesting is unlikely to significantly influence nutrient loss from highly organic soils common in Southeast Alaska. Assuming fertilizers or herbicides are not used as silvicultural treatments in the study area, multi-entry harvest over the rotation period should not cause significant long-term cumulative effects on stream nutrient budgets.

Streamflow

Increased streamflow may provide a deleterious effect to stream habitat, causing a decline in fish population. The best available data on stream runoff responses to timber harvesting suggest that at least 25 percent of a watershed must be harvested in a single entry before measurable increases in stream runoff will occur (Bosch and Hewlett 1982). In effect, as young trees begin to reach a certain age and size, they collectively utilize as much or more water than the overmature stand they replaced. The harvest percentages for the multi-entry harvest on National Forest lands in Analysis Area 6 are listed by VCU in Table 4-35. All of the VCUs have a total harvest levels well below 25 percent.

Table 4-35

Area and Percentage of Watersheds Projected to be Harvested Through 2011¹

VCU	Years Since Harvest at Year 2011				
	<i>Total Land</i>	<i>30+ Years</i>	<i>20-30 Years</i>	<i><20 Years²</i>	<i>Total 2011</i>
<i>Acres</i>					
235	33,642	188	0	2,430	2,618
236	11,029	1,269	341	925	2,535
237	6,646	0	421	421	842
238	9,946	0	1,134	100	1,234
239	17,387	1,141	499	148	1,788
240	9,549	0	0	932	932
241	7,635	715	0	708	1,423
242	11,334	1,214	367	377	1,958
243	27,710	2,936	840	761	4,537
244	11,895	2,198	0	259	2,457
245	23,834	4,110	0	1,433	5,543
Total	170,607	13,771	3,602	8,494	25,867
<i>Percent</i>					
235		0.6	0	7.2	7.8
236		11.5	3.1	8.4	23.0
237		0	6.3	6.3	12.7
238		0	11.4	1.0	12.4
239		6.6	2.9	0.9	10.3
240		0	0	9.8	9.8
241		9.4	0	9.3	18.6
242		10.7	3.2	3.3	17.3
243		10.6	3.0	2.8	16.4
244		18.5	0	2.2	20.7
245		17.2	0	6.0	23.3
Total ³		8.1	2.1	5.0	15.2

SOURCE: SEIS Planning Record.

¹ Percentages are based on the total acres within a VCU, rather than on the percentage of the VCU which falls outside of a watershed. Total harvest to year 2011 is based on the Life of Sale Plan prepared in 1982 and updated in 1986.

² Figures shown indicate the Life of Sale Plan volume scheduled has not been harvested as planned, but may be harvested at a higher rate later in the first entry.

³ This value represents the percent of projected harvest in the entire analysis area.

In Southeast Alaska, very little data are available to aid in evaluating the potential long-term effects of second-growth forest on summer lowflows, however, the expected aggregate level of activity in a watershed can be used to make a professional judgment. The cumulative timber harvest over rotation is projected to be generally less than 40 percent for individual watersheds in the 1986-90 study area (Forest Service 1986b, p. 4-259). Multi-entry sustained yield second-growth management will result in a variety of age classes in forest stands spread out over a watershed. These conditions would reduce the risk of significantly affecting summer runoff. Therefore, based on the current state of knowledge, the watersheds in the 1986-90 study area are not judged to be susceptible to long-term cumulative effects of vegetation change on summer low-flow conditions.

Streamside Disturbance Effects

Long-term inputs of sediment from channel and bank disturbances would be minimal over the harvest rotation. Due to application of Aquatic Habitat Management prescription guidelines on National Forest lands, the total potential miles of streambanks affected is anticipated to be small. Streamside areas with a vegetative buffer strip of undisturbed forest would have negligible stream channel disturbance and sediment inputs from harvest activities. Areas with harvest to the stream bank would employ active streamside management prescriptions, which are designed to minimize disturbances and to maintain habitat. Streamside harvest levels in all VCUs are expected to be less than 20 percent for Class I and II streams over the first harvest rotation. These activities would occur over three harvest entries so the level of disturbance in a given entry would be less than the 10 percent harvest level monitored in Indian River. Therefore, sedimentation resulting from stream channel disturbance is unlikely.

Mass Wasting Effects

To evaluate the potential cumulative effects of mass wasting on stream channels and water quality, a watershed condition index was determined. This condition index is based on the percentage of extreme hazard soil areas affected by harvest activities within a watershed and indicates the relative risk of management induced sediment inputs from mass wasting. Table 4-36 summarizes the amount of these hazard soils affected by harvest units and roads as a percent of the total VCU area. A hazard soil level of 10 percent was evaluated by the IDT to be a threshold between a low risk for cumulative sediment effects and a moderate risk of

Table 4-36

Acres of Hazard Soils Affected by Harvest Units and Roads as a Percentage of the Total VCU Area

VCU	Total Area	Harvest Units	Roads	Percent of VCU
235	33,642	27	2,655	8
236	11,029	8	649	6
237	6,646	2	128	2
238	9,946	1	896	9
239	17,387	14	962	3
240	9,549	41	0	0
241	7,635	36	10	1
242	11,334	8	770	7
243	27,710	35	1,816	7
244	11,895	12	120	1
245	23,834	41	235	1

SOURCE: SEIS Planning Record.

management induced effects. This threshold is thought to be a reasonable value based on studies of land use development in coastal watersheds having extensive areas of extremely hazardous soils. Based on this criterion, no VCUs in the analysis area have a high potential of cumulative sediment effects.

Long-term development in these watersheds could potentially result in cumulative sediment effects depending on the nature and timing of activities and the location of roads and harvest units with respect to stream channels.

The evaluation of potential cumulative effects of mass wasting should be viewed with caution. The evaluation is based on the potential risk of mass soil movement associated with naturally landslide prone soils. These soils have a high risk of natural mass failures as well as a high risk of management induced failure. The evaluation, however, is not based on on-site investigations. Some portions of these hazard soil units have a significantly lower risk of mass failure. Also, this analysis procedure did not consider mass wasting sediment delivery potential into drainage ways and streams and does not evaluate sediment routing through the stream networks. A precise assessment of landslide probability and quantification of cumulative downstream sediment impact potential cannot be developed with current state of knowledge and available data.

Soils

The stability of soils varies a great deal, depending on such factors as parent material, drainage, drainage dissections (V-notches), slope gradient, and slope form. The events of greatest concern are slope failure and mass wasting, which is defined as the downslope movement of soil and organic material under the force of gravity, and includes debris flows, debris avalanches and debris torrents.

The most important factor in predicting mass wasting potential is slope gradient. Most soils in Southeast Alaska are subject to landslides at a gradient of about 67 percent. Once slopes exceed this gradient, their stability decreases significantly.

Soils mapped for Southeast Alaska have been rated as Extreme, High, Moderate, or Low for mass wasting hazard (Integrated Resource Inventory Interpretations Handbook, unpublished). Hazard ratings help to predict the probability of slope failure in landscapes of various composition and form. Soils with extreme and high mass wasting hazards are expected to have an increased level of mass wasting above that for the overall average of the Forest. Soils associated with moderate and low mass wasting hazards are expected to have a mass wasting level below that of the overall average for the Forest.

Generally, poorly drained, fine-textured soils on very steep, highly dissected landforms are far more prone to mass wasting events than are well drained, deep, coarsely sorted soils on moderate gradients and smooth landforms.

Recent research on landslides in Southeast Alaska (Swanston 1989) concluded that most landslides occur in unique topographical situations (slopes in excess of 75 percent and hillslope depressions). Although over 90 percent of all landslides in the last 20 years were not related to logging or roads, logging and roads do increase the potential for landslides in a given site. Naturally occurring slides tend to be larger and travel further than logging related slides. Only 3 percent of all slides reach anadromous fish streams.

Mass wasting events will tend to occur with more frequency after harvesting, because the stabilizing root structure of trees has been removed. Typically, it takes 3 to 7 years of regrowth to establish enough interlocking root strength to stabilize the slope. After approximately 20 years, slope stability will have returned to normal in most cases.

High Hazard Soils

Soils rated as high for mass wasting hazard will be found under the following conditions: (1) very steep slopes (greater than 75 percent) with infrequent V-notch dissection, stable parent materials, and well drained soils; (2) steep slopes (55 to 75 percent) with frequent V-notch dissection and well drained soils; (3) steep slopes (55 to 75 percent) with infrequent V-notch dissection and inadequately drained soils, or (4) moderately steep slopes with frequent dissection, unstable parent materials, and/or poorly drained soils.

Standard management practices may have only limited success, and on-site investigations are necessary to determine the need for mitigating measures. After timber harvest, sites with high mass wasting hazard may experience 5 to 10 times the average mass wasting occurring on the Forest under natural conditions. As is true of extreme hazard soils, slope failures may occur in increasing numbers from 3 to 7 years after timber harvest and then taper off. Mass wasting and slope failures on these soils are usually considered to be “reclaimed” from management-induced mass wasting after about 15 years.

Moderate Hazard Soils

Soils rated as moderate for mass wasting are generally found in the following conditions: steep slopes (55 to 75 percent) with infrequent V-notch dissection, stable parent materials and well drained soils; moderately steep slopes (35 to 55 percent) with frequent V-notch dissection and well drained soils; moderately steep slopes (35 to 55 percent) with infrequent V-notch dissection and inadequately drained soils, or gentle slopes (5 to 35 percent) with frequent dissection, unstable parent materials and/or poorly drained soils. Standard management practices are usually successful. After timber harvest, moderate hazard soils may experience as much as 5 times the mass wasting experienced on the same soil under natural conditions. Slope failures may occur in increasing numbers from 3 to 7 years after timber harvest and taper off rapidly thereafter. The site can be considered “reclaimed” from management-induced mass wasting when slope failures appear to occur in frequency and magnitude equal to that of natural conditions.

Low Hazard Soils

Soils rated as low for mass wasting hazard are in generally gently sloping and/or rolling topography. In these cases, steep slope gradients will not be combined with dissection, parent materials, or drainage conditions to pose significant mass wasting hazards. Both natural and management-induced mass wasting events are rare and small in extent. Unlike the other soils, these soils will not experience the average five-fold increase in mass wasting after timber harvest. Mitigation is generally effective in reclaiming these sites.

Soil hazard ratings for specific harvest units may be found in the Unit Cards, Appendix A-1. In Analysis Area 6, the relationship between proposed harvest and soil hazard ratings is shown in Table 4-1, at the beginning of this chapter.

Marine Environment

Log transfer facilities are currently in operation in VCU 236 at Corner Bay. Although all LTF sites in Analysis Area 6 have bark accumulation in the marine environment, management objectives outlined in the Tongass Land Management Plan provide for mitigation measures to prevent long-term or irreversible impacts to the marine environment.

Recreation

By the end of the APC Contract period, there would be changes in the recreation opportunities in Analysis Area 6, with a shift from the primitive and semi-primitive opportunities that dominate today to a mix of primitive, semi-primitive, and roaded recreation opportunities.

Additional roads constructed to access harvest units would increase roaded acreage while road management practices including road standards, maintenance, and closures would affect the quality of roaded recreation opportunities. For example, some closed roads may be turned

4 Environmental Consequences

Sitkoh Bay



into hiking trails. Opportunities to engage in current recreation activities, including bear, deer, and waterfowl hunting as well as saltwater and freshwater fishing are expected to continue with modifications to specific areas (see individual VCU narratives below). Also expected to continue are trapping, beach combing, clamming, crabbing, camping, and hiking.

Although the physical recreation setting of Analysis Area 6 would change by 2011, recreation use is not expected to change significantly due to continued limited access. By 2011, approximately 206 miles of road would be constructed and available for recreation use in Analysis Area 6. Commercial recreation operators may provide vehicles for general public use on the roads, providing a potential opportunity for roaded recreation. In general, however, public vehicle access would not be available. Future access to Analysis Area 6, including ferry service or roads connecting to communities with ferry service, is not planned. New roads may be used for hiking by visitors who access the area by boat or used seasonally by Corner Bay camp residents, or other residents of Analysis Area 6.

The recreation opportunities that would be available in each VCU of Analysis Area 6 by the year 2011 were evaluated by examining potential ROS changes. The long-term and cumulative effects, discussed by VCU below would occur under any of the action alternatives.

VCU 235: Opportunities would continue to change from largely semi-primitive and primitive to roaded. The estuary itself would remain in a natural condition with adjacent road access available from Corner Bay, Sitkoh Bay, and False Island. Due to its proximity to Corner Bay, visitation from seasonal Corner Bay logging camp residents is expected to continue and would increase if the camp population increases.

Roadside areas along the estuary would remain natural. However, period traffic volume and noise from harvest operations in the vicinity of the estuary would change the present recrea-

tion experience. The road system would pass through harvested areas, also not attractive for some forms of roadside recreation. Visitation is expected to increase to the Kadashan estuary as road access becomes available from Sitkoh Bay. Private lands in Sitkoh Bay may contain a lodge and vehicles for use by guests.

VCU 236: Recreation opportunities in VCU 236 would continue to be roaded, much the same as they are today. Some areas of the VCU that currently provide semi-primitive and primitive opportunities would also be converted to roaded opportunities. Corner Bay residents are expected to be the major recreational users of the area and would likely pass through VCU 236 on the way to other recreation destinations as well.

VCU 237: More roaded opportunities would be available in the future as roads are constructed. The road along Trap Bay may continue to provide excellent opportunities for roadside recreation, as it would receive limited vehicle traffic when active logging is not in progress. The relatively small size of harvested areas and the unit spacing should provide diversity for recreationists.

Visitors to Trap Bay could hear sounds of logging during active logging periods, especially along the shoreline portion of the road. It is estimated that logging would be occurring during no more than 12 years of the 100 year period, thus providing a desirable area for roaded recreation most of the time. Most shoreline areas would remain in a natural condition, with limited affects to saltwater oriented users.

VCU 238: Recreation opportunities in VCU 238 would change from primarily primitive and semi-primitive to primarily roaded. A road along the coastline would provide opportunities for roadside recreation and possibly beach access for road recreationists. Shoreline areas would remain natural in appearance.

VCU 239: The recreation experience at Kook Lake would be changed as timber is harvested in the vicinity of the lake. The transportation system in the Kook Lake area will be used to transport timber during periods of active logging. The Forest Service cabin at Kook Lake would remain and would become accessible by road. Trail construction opportunities at Kook Lake would remain. Recreationists in VCUs 238 and 239 would access these areas primarily from Corner Bay.

VCU 240: The recreation opportunities would gradually shift from primitive to more roaded each time this VCU is entered. By 2011, VCU 240 will be accessible on the road system from Corner Bay, Sitkoh Bay, and False Island. Road access adjacent to Basket Bay would provide opportunities for roaded recreationists to visit with a short hike to the beach. Future Angoon selections could further modify the existing recreation opportunities within this VCU.

VCU 241: This VCU would provide a mix of roaded and primitive recreation opportunities because the road would extend only along the shoreline and leave a large expanse of land undeveloped in this VCU. The road, which connects with the Sitkoh Bay and False Island road systems, would be heavily used during periods of active logging.

VCU 242: With the exception of the east coast of VCU 242, by 2011 most of this area would provide roaded opportunities.

VCU 243: The Sitkoh Bay estuary would remain largely unmodified while other shoreline areas of the bay would be harvested. Logging roads in the vicinity of the Chatham Cannery and other areas could be managed for future trail systems to provide alpine access and semi-primitive recreation opportunities. If a lodge is developed at the Chatham Cannery, and the operators provide vehicles, the road system around Sitkoh Bay could provide motorized roaded recreational opportunities. Road access to Sitkoh Creek from Corner Bay, as well as the Chatham Cannery, would provide additional opportunities for steelhead anglers.

VCU 244: This VCU, already heavily roaded, would gradually become more roaded each time this VCU is entered for timber harvest. Likewise, the recreation opportunities would be-

4 Environmental Consequences

come more roaded, if the False Island road system is connected to Corner Bay, as well as Sitkoh Bay. If the logging camp is closed down after each entry, the social setting would shift from more primitive when logging was not taking place, to social when logging is in effect. The two cabins and trail at Sitkoh Lake would probably be maintained beyond 2011.

In VCU 245: This VCU would gradually become more roaded each time it is entered for timber harvest. The recreation opportunities would become more roaded as well. The road system is planned to connect to the Corner Bay and Sitkoh Bay road systems, providing further access to those who keep vehicles in the area. If the False Island logging camp is closed down after each entry into VCU 245, the physical setting would remain roaded modified but the social setting would shift from primitive during periods of no logging to more social during periods of logging.

Visual Resources

The potential for visual impact is greatest right after timber is harvested. In the foreground (up to 1/2 mile), stumps and debris are dominant. Activities associated with road construction, such as cut and fill slopes, rock pits, and turn outs would be readily visible to the observer. As seen in the middleground (1/2 mile to 2 miles), vivid distinction in texture of the mature stand and the harvest unit would be apparent. Exposed boles and limbs of the adjacent stand would dominate the visual setting.

The fifth year of regeneration the new forest would be filling out with low lying vegetation (berry bushes, ferns, etc.). In some cases, young alder would be present where disturbance occurred. In the foreground, the visual effects of the clearcut would still be evident, but the

*Kadashan Road Looking
Toward Corner Bay*



shrubby vegetation and young trees would begin to cover over the stumps and exposed ground. In the middleground, the harvest unit would remain evident, with sharp contrast in color and texture.

From year five to twenty, the young trees would establish themselves, reaching a height of approximately fifteen feet. In the foreground, at the end of twenty years, the forest visitor would see a healthy, thinned stand of spruce and hemlock, with some yellow cedar. If views had been created with the original clear cut, they would become limited. The pre-commercial thinning process would create a well defined stand. In the middleground, the contrast between the new forest and the mature forest would be very obvious.

At the end of fifty years, the new forest would reach a height of approximately fifty feet. As seen in the middleground, this stand would be approximately half the height of existing mature stands, providing a smooth visual transition at the harvest unit boundary. Should new harvest occur adjacent to the 50-year stand, the effect would be an even less obvious transition. In the foreground, the growth of the stand would limit views beyond the original unit. At the end of fifty years, the canopy would be closing and the new forest would appear very dense.

Towards the end of eighty years, the stand would reach 75 percent of its mature height. From the middleground there would be less distinction between this stand and adjacent mature forests. The canopy would appear full with crowns touching, allowing little sunlight to reach the forest floor and little understory vegetation to establish. As seen in the foreground, tree boles of 23-inch diameter would be visibly dominant from the road and the canopy visible at approximately thirty feet from the forest floor. Road side vegetation would include ferns and berries.

At 100 years, little difference would be noticed between the 100-year forest and an adjacent overmature forest. Timber would reach approximately 100 feet and appear healthy, lush and with full canopy. In the foreground, the new forest would be extremely dense, with little light reaching the forest floor. Selective harvest or small group selection may be necessary adjacent to recreation roads to allow additional sunlight, for safety purposes, or to increase vista opportunities. In the middleground, the color and texture of the new forest would allow distinction between it and adjacent overmature forests, which display a scattering of dead tops with a generally more irregular tree growth pattern.

Following is a description of the visual condition of each VCU by the year 2011 under the continued implementation of the TLMP and the long term APC contract:

VCU 235: Most areas would appear in a predominantly natural condition as seen from the Alaska Marine Highway and small boat route in Tenakee Inlet and the Sensitivity Level 2 use area around Kadashan Bay. Timber on proximal slopes facing Kadashan Bay and the lower drainage of the Kadashan River are scheduled to be managed with extended rotations (LUD III), which would aid in screening harvest activities in the upper drainages. Most harvest activities in the Tonalite Creek drainage would be unseen from saltwater viewing points. Many timber stands in the upper Kadashan River drainage, seen in the foreground from the road, would be harvested in six entries over a 200-year extended rotation to help reduce potential visual impacts and to meet assigned VQOs. Along the main road system viewers could expect to see recent harvest units, young and mature forests, as well as old-growth throughout the entire rotation.

VCU 236: Changes in the Corner Bay area would continue to occur over the entire rotation, as seen from the Alaska Marine Highway and small boat routes in Tenakee Inlet. Timber stands on slopes facing Tenakee Inlet would be harvested over a 120-year extended rotation in order to reduce potential adverse visual impacts. From saltwater travel routes viewers could expect to see continuous activity at the log transfer facility and logging camps. Regenerating harvest units, recently harvested units, young and mature forests, as well as unharves-

table old-growth would be visible throughout the Corner Bay drainage. Viewers from the road could expect to see this activity in the foreground distance throughout the drainage. Alteration of vegetation would be consistent with modification and maximum modification VQOs.

VCU 237: The majority of VCU 237 would appear in a modified condition when viewed in the middleground from marine traffic routes in Tenakee Inlet. Proposed harvest units would be in a 120-year extended rotation to further aid in reducing potential adverse visual impacts. Long-term visual changes would be consistent with the assigned VQOs.

VCU 238: Harvest activities proposed on the slopes facing Chatham Strait would be visible in the middleground from marine travel routes in Chatham Strait. Timber on these slopes would be harvested in four entries over a 120-year extended rotation to aid in reducing potential adverse visual impacts. Changes to the landscape would be consistent with the assigned modification VQO over the long term. Most harvest areas in the upper drainages would be unseen from the travel routes in Chatham Strait.

VCU 239: Portions of this VCU are visible from the Alaska Marine Highway and small boat route in Chatham Strait and are scheduled to be harvested in multiple entries with a 120-year extended rotation to aid in reducing potential adverse visual impacts. The shoreline area surrounding Kook Lake will be managed as an island lake according to the TLMP, with resultant modified timber harvest scheduling. On the upper slopes around Kook Lake the timber would be harvested in six entries over a 200-year extended rotation to aid in reducing potential visual impacts from the lake and Forest Service recreation cabin. Because of the close viewing distance and the assumption that clearcutting would be the only silvicultural treatment used, meeting the assigned retention VQO around the lake would be difficult throughout the rotation. Changes in the landscape would be more consistent with a partial retention VQO in this area over the long term.

VCU 240: The majority of timber harvesting activities would not be visible to marine travelers in Chatham Strait. From the small plane route along Chatham Strait, harvest operations ranging from recent harvest units to young and mature forests would be visible in this VCU. Changes in the landscape over the long term would be consistent with the assigned modification and maximum modification VQOs.

VCU 241: The shoreline and slopes facing Chatham Strait, visible in the middleground from the Sensitivity Level 1 travel routes, are the most visually sensitive lands in this VCU. Over time, viewers could expect to see a range of visual conditions on these slopes. These varied conditions include past harvest units continuing to regenerate into mature forested stands and new harvesting over a 120-year extended rotation to help in mitigating adverse visual effects. Other areas of VCU 241 would be visible from the small plane route along Chatham Strait. This view would be of a continually changing forest environment ranging from active logging operations to young and mature forested stands. Over the long term, changes in the entire VCU would be consistent with the assigned modification VQO.

VCU 242: Timber on the slopes facing Chatham Strait would be harvested in a 120-year extended rotation to reduce potential adverse visual impacts. Changes in this landscape would be consistent with the assigned modification VQO. Harvest activities occurring in the upper drainages would be visible from the small plane route through the pass from Sitkoh to Chatham. From the air, harvest operations ranging from recent harvest units to young and mature forests would be evident. Over the long term, viewers could expect to see changes consistent with modification and maximum modification VQOs.

VCU 243: Timber at the entrance to Sitkoh Bay and Florence Bay would be harvested in four entries over a 120-year extended rotation to aid in reducing potential adverse visual impacts. Viewers from the small boat route in Sitkoh Bay could expect to see reforestation of clearcuts along the shoreline and new harvest units in adjacent areas. Changes that would occur at the Bay's entrance would be consistent with the assigned modification VQO. From the small

plane route traveling through the pass to Chatham Strait and from the road within the VCU viewers could expect to see intensive harvest operations comparable to past activities in this area. Changes in the landscape over the long term would be consistent with modification and maximum modification VQOs.

VCU 244: Many of the more visually sensitive lands in VCU 244, as seen from the foreground and middleground of the Level 1 Forest Service recreation cabin and trail, have been intensively harvested over the past twenty years. The visual quality objectives for these second-growth forests include an extended rotation. Some of the remaining timber along the lake shore and stream are also scheduled to be managed with an extended rotation. Over the long term, viewers could expect to see past harvest units continuing to regenerate to mature forests and recent harvesting activities on the hillsides on the southern half of this VCU. Most changes to this VCU would be consistent with a modification VQO.

VCU 245: The most visually sensitive lands within this VCU are those slopes facing Peril Strait, which are visible in the middleground from the Alaska Marine Highway, small boat, and plane routes. Much of the timber along the shoreline have been intensively harvested over the past 20 years and have resulted in Type VI visual conditions, which are in strong contrast with the characteristic natural appearing landscape. Timber visible from the Peril Strait travel routes are to be harvested in four entries over a 120-year extended rotation to aid in mitigating further adverse visual effects. Over the long term, viewers could expect to see past harvest units regenerating to mature forests, as well as new units interspersed among the existing timbered slopes. For the most part, changes resulting from future management would be consistent with the modification VQO.

Cultural Resources

Impacts from natural decay, landscape changes, private developments, and timber management activities have combined to destroy or disturb a portion of the cultural resources of Southeast Alaska. Development activities of all kinds pose particular threats to cultural resources because they tend to be located in the same places that cultural resources are found, such as sheltered coastal settings. In addition, areas where landowners have clearcut blocks of land or plan an accelerated period of timber harvest are also of concern.

Because little inventory has taken place in the area, it is impossible to determine the exact nature and number of resources that have been lost. Mitigation measures have only been implemented during recent years. Implementing the No Action Alternative (No. 1) could slightly lessen long-term and cumulative effects on cultural resources. The existing cultural resource compliance review process incorporates a consideration of cumulative effects for the proposed action alternatives on National Forest land. Future timber management activities could combine with other ground-disturbance to result in continued loss of cultural resources. The implementation of various mitigation measures would reduce this loss by preserving significant sites and by providing data on those that cannot be preserved.

Socioeconomic Impacts

The primary socioeconomic impact of a long-term timber harvest would be a shift in log grades resulting from a transition of mature and overmature stands to second growth, affecting the lumber and wood products industry in Southeast Alaska. This impact would fall most heavily on cant producers in the industry, who require select and No. 1 grade spruce and hemlock logs. Some volume of No. 1 grade logs would exist, however, to support some cant manufacture. Due to the primary processing requirements attached to the purchase of National Forest timber, the wood products industry is expected to continue in Southeast Alaska. As long as logs continue to command higher profits per unit than sawn products in Pacific Rim markets, no incentive would likely exist for native land owners or the State to provide logs to the mills.

The potential of expanding the production of dimension lumber and alternative products could result in a positive impact on the lumber and wood products industry. Recent analyses

of alternative product mixes for the Southeast Alaska lumber and wood products industry (Forest Service 1985) indicate that a modest restructuring of the industry could accommodate the harvest of second-growth timber. The product mix associated with this new structure is predicated on current market prices. The restructuring of the industry, although possible with existing prices, would also require investment by the public and/or private sector(s) in new processing facilities.

Pulp production would retain a pivotal relationship in the market for logs and chips in the restructured industry. Cant production, as previously discussed, would be reduced to one-quarter of all volume processed, regardless of source. Lumber production would increase to a level equal to the present cant production. Chip production would remain the same, and the remaining volume (about 10 percent) could result in a plywood substitute.

New markets, lower relative production costs compared to other Pacific Rim countries, investment in existing industry to increase productivity, or an increase in prices for Alaska lumber and wood products would aid in the use of second-growth timber. With the stabilizing of these Alaska wood product exports, some of these conditions, as well as a restructuring of the industry, could take place.

Contribution of Timber from State and Private Lands

Overall demand for Southeast Alaska timber has remained relatively constant over the last six years. Demand for National Forest timber, however, has declined since 1980, as timber supplied from private landowners and Native Corporations almost tripled. During the first half of the 1980s, in response to market demand for logs, harvest on Native Corporation and other private lands has been directed at the more accessible and better quality timber. Timber from Native Corporation and other private lands can be exported as unprocessed logs and are not subject to the "primary manufacture" requirement of National Forest timber. Furthermore, higher quality, unprocessed logs have been in greater demand than the processed wood products from National Forest timber. Timber harvests from private lands throughout Southeast Alaska are expected to range up to 350 million board feet per year until the mid to late 1990s if current market conditions continue. Once these finite high-quality stands of overmature timber are harvested, the remaining less valuable, low volume stands would be more expensive to harvest and more difficult to market. If demand continues at current levels, the demand for National Forest timber would increase when harvests on other ownerships decline and cost differentials narrow.

The major landholders, other than the federal government within or near the APC Contract area, are Native Corporations. They are Sealaska, a regional corporation, and Huna Totem, a village corporation.

ANILCA Section 810 Subsistence Evaluation

Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) requires a Federal agency, having jurisdiction over lands in Alaska, to evaluate the potential effects of proposed land-use activities on subsistence uses and needs. Section 810 of ANILCA states:

In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the agency having primary disposition over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such federal agency

1. gives notice to the appropriate state agency and appropriate local committees and regional councils established pursuant to ANILCA Section 805;
2. gives notice of, and holds, a hearing in the vicinity of the area involved; and
3. determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands; (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition; and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such action.

As noted in Chapter 3, the 1981-86 Record of Decision (ROD) preceded the passage of ANILCA. The Federal District Court, in *Tenakee Springs v. Courtright*, did not decide if the Forest Service complied with Section 810. To ensure that the 1981-86 and 1986-90 Records of Decision do comply with ANILCA, the Forest Service further evaluated the potential effects to subsistence uses resulting from the proposed actions considered in the Supplemental EIS. Since ANILCA, one subsistence evaluation has been made for the area included in Analysis Area 6 for the 1986-90 Record of Decision. The evaluation concluded that the proposed actions would have no or only minor potential impact to subsistence users of Analysis Area 6. In *Hanlon v. Barton*, however, the Federal District Court concluded that the Forest Service must consider the cumulative impacts to subsistence resources and subsistence users of past, proposed, and reasonably foreseeable future activities in conducting an ANILCA Section 810 Subsistence Evaluation. Further, the Court noted that actions need not be connected to be considered as cumulative effects.



Chapter 3 addressed current and historical subsistence uses on northeastern Chichagof Island (Analysis Area 6), by the rural communities of Angoon, Elfin Cove, Gustavus, Haines, Hoonah, Kake, Klukwan, Pelican, Petersburg, Sitka, Tenakee Springs and Wrangell.

This section evaluates how the proposed action alternatives in Analysis Area 6 could affect subsistence resources used by the above communities. The subsistence resource categories evaluated are fish, timber, wildlife, and other foods such as berries and kelp. Effects of the proposed alternatives are evaluated by: (1) changes in abundance or distribution of subsistence resources, (2) changes in access to subsistence resources, and (3) changes in competition from non-subsistence users for those resources. The evaluation determines whether subsistence uses in Analysis Area 6 or portions of Analysis Area 6 would be significantly restricted by any of the proposed action alternatives. To determine this, the evaluation: (1) considers the availability of subsistence resources in the surrounding areas; (2) considers the cumulative impacts of past and foreseeable future activities on subsistence users and resources; (3) looks at potential cultural and socioeconomic implications affecting subsistence users; and (4) focuses on the mapped important subsistence-use areas in Analysis Area 12. (Important Subsistence Area Use Map, in Map Packet.)

The evaluation relies heavily upon the use of wildlife habitat capability models as well as upon ADF&G hunter survey data. (See Consolidated Appendix, Volume II, C-3 for discussion of data adequacy and habitat capability models used.)

Draft SEIS Evaluation

The Draft SEIS Subsistence evaluation for Analysis Area 6 focused on the rural communities that intensively use the area for subsistence purposes. The evaluation projected the potential effects to subsistence resources such as fish, wildlife, other subsistence foods, and timber. The intent of the evaluation was to find whether any proposed alternative "may" significantly restrict subsistence use in the Analysis Area. The findings determined: (1) the proposed action alternatives "may" restrict subsistence use of wildlife; (2) the proposed alternatives would have no or only minor effect on subsistence users for the other categories evaluated; (3) the foreseeable timber harvest schedule prescribed in the Tongass Land Management Plan poses enough potential for affecting subsistence uses to substantiate a finding of "may" restrict subsistence use of wildlife. Based on the findings and the Federal District Court's finding in *Hanlon v. Barton*, Subsistence Hearings were scheduled.

Phase I of the Draft SEIS broadly addressed the availability of other lands suitable for the purpose of the Supplemental EIS. (See discussion in Chapter 2, under sections, Areas Eliminated from Detailed Study 1981-86 EIS and Alternatives Eliminated from Detailed Study in 1986-90 EIS.)

The range of alternatives in the Phase II Draft SEIS, for Analysis Area 6, displayed sensitivity for reducing or eliminating proposed actions on subsistence-use lands. This sensitivity has been carried forward into the FEIS for Analysis Area 6.

Hearings

The hearings and open houses were announced in a letter accompanying the Draft SEIS, mailed June 9, 1989. Letters were sent to the Alaska Department of Fish and Game, Regional Fish and Game Advisory Councils, Local Fish and Game Advisory Committees, and to each Post Office in the eleven communities where hearings were to be held. Announcements were made in newspapers and on radio stations in the northern Chichagof Island vicinity.

An administrative oversight necessitated re-scheduling the hearings from July 10-14 to August 10-12. In late-June, another letter was sent to all people on the EIS mailing list. The letter announcing the hearings also furnished the following information: testimony at the Hearing could be either verbal or written; people unable to attend could have another person submit their written testimony at the hearing; people could send written testimony to the SEIS Team if postmarked on or before the date of the hearing in the community the testimony was given.

An open house, beginning at 2:00 pm, preceded each hearing. People were invited to review information presented in the Draft Supplemental EISs and to ask questions of the planning staff who prepared the documents. Information displayed at the open houses included maps which displayed harvest units and roads being proposed by each Alternative. Harvest units thought to be of particular concern to the hearing community, were highlighted on the maps displayed. The identification of units of possible concern was based upon TRUCS inventory data.

Hearings and open houses scheduled in the vicinity of Analysis Area 6 included:

Hoonah	Aug. 10, 1989	Hoonah City Hall
Point Baker/Port Protection	Aug. 10, 1989	Point Baker Community Hall
Tenakee Springs	Aug. 10, 1989	Community Hall
Wrangell	Aug. 10, 1989	Catholic Parish Hall
Angoon	Aug. 11, 1989	Angoon Town Hall
Pelican	Aug. 11, 1989	Pelican City Hall
Petersburg	Aug. 11, 1989	Forest Service Supervisors Office
Port Alexander	Aug. 11, 1989	Community Hall
Gustavus	Aug. 12, 1989	Gustavus School
Kake	Aug. 12, 1989	Kake High School
Sitka	Aug. 12, 1989	Verstovia School

On August 10, 1989, hearings were held at Hoonah, Point Baker, Tenakee Springs and Wrangell. At Hoonah, sixty one people attended the hearing, twenty nine people gave verbal testimony, and twenty seven pieces of written testimony were accepted by the Hearing Officer. At Point Baker, nine people attended the hearing, six people gave verbal testimony, and eleven pieces of written testimony were accepted by the Hearing Officer. At Tenakee Springs, thirteen people attended the hearing, seven people gave verbal testimony and 1 piece of written testimony was submitted prior to the hearing. At Wrangell, eight people attended the hearing, one person gave verbal testimony, and one pieces of written testimony was accepted by the Hearing Officer.

Drying Herring Roe



On August 11, 1989, hearings were held at Angoon, Pelican, Petersburg and Port Alexander. At Angoon, eight people attended the hearing, seven people gave verbal testimony, and 1 piece of written testimony was accepted by the Hearing Officer. At Pelican, 6 people attended the hearing, and two people gave verbal testimony. At Petersburg, eight people attended the hearing and one person gave verbal testimony. At Port Alexander, four people attended the hearing and all gave verbal testimony. No written testimony was received by the Hearing Officers in Pelican, Petersburg and Port Alexander.

On August 12, 1989, hearings were held at Gustavus, Kake and Sitka. At Gustavus, nine people gave verbal testimony at the hearing, and two pieces of written testimony were accepted by the Hearing Officer. At Kake, nine people attended the hearing and all presented verbal testimony. No written testimony was received by the Hearing Officer. At Sitka, seventeen people attended the Hearing, five people gave verbal testimony, and forty pieces of written testimony were accepted by the Hearing Officer.

Citizens in Elfin Cove requested a subsistence hearing also be scheduled at Elfin Cove. This request came shortly before the hearings were scheduled to begin. To accommodate their request would have required a new announcement rescheduling all of the hearings. The Forest Service decided to proceed with the hearings as scheduled. In response to Elfin Cove's request, an open house was scheduled in Elfin Cove on August 14, 1989 to provide an opportunity for fishers fishing out of Elfin Cove and citizens residing in the community the chance to comment on the Draft SEIS. Due to inclement weather, the open house had to be cancelled. One written comment was received from the community of Elfin Cove concerning the hearings.

The hearing transcript of the proceedings for each community can be found in Consolidated Appendix, Volume I, B.

The verbal and written testimony received at the hearings provided important additional information pertinent to the subsistence evaluation for the FEIS in Analysis Area 3.

Final SEIS Findings

Using the information gathered from the hearings and written public comments, the FEIS subsistence evaluation considers, with distinct findings by alternative and by resource category, whether or not there is a significant possibility of a significant restriction of subsistence use. Again, the resource categories evaluated are fish, wildlife, other foods, and timber. As indicated earlier, the evaluation considers the effects by alternative on (1) access, (2) abundance or distribution, (3) and competition for each resource category.

The Alaska Land Use Council's definition of "significantly restrict subsistence use" is one guideline used in the findings. By this definition:

A proposed action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance of, or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by non-rural residents. The responsible line officer must be sensitive to localized, individual restrictions created by any action and make his/her decision after a reasonable analysis of the information available.

The U.S. District Court Decision of Record in *Kunaknana v. Watt* provided additional definitions of "significant restriction of subsistence uses" and are also used as guidelines in the findings. The definitions from *Kunaknana v. Watt* are:

Significant restrictions are differentiated from insignificant restrictions by a process assessing whether the action undertaken shall have no or slight effect as opposed to large

or substantial effects. In further explanation the Director (BLM) states that no significant restriction results when there would be “no or slight” reduction in the abundance of harvestable resources and no occasional redistribution of these resources. There would be no effect (slight inconvenience) on the ability of harvesters to reach and use active subsistence harvesting sites; and there would be no substantial increase in competition for harvestable resources (that is, no substantial increase in hunting by non-rural residents).

Conversely, restrictions for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence-use sites or major increases in....non-rural resident hunting.

In light of this definition the determination (finding) of significant restriction must be made on a reasonable basis, since it must be decided in light of the total subsistence lands and resources that are available to individuals in surrounding areas living a subsistence lifestyle.

The Final SEIS evaluates the availability of subsistence resources in surrounding areas that could be accessed without undue risk or economic hardship to subsistence users.

Chapter 3 concluded that all the VCUs in Analysis Area 6 are used for harvest of subsistence resources. Specific areas within these VCUs, however, are more important for harvesting subsistence resources (Important Subsistence Use Area Map). Some proposed timber harvest units are within mapped important subsistence-use areas. Table 4-37 lists the harvest units by alternative. The locations of the proposed units, found on the alternative maps, are considered in the evaluation and the findings.

Due to the number of proposed timber harvest units located within mapped important subsistence-use areas (Table 4-37), the FEIS reevaluates the use of other available lands. The Phase I Final SEIS addressed the need to harvest timber from Analysis Area 6. Within Analysis Area 6, other areas are theoretically available for timber harvest, however two related factors make it impractical to use them. The first factor involves the logistics of providing timber to Alaska Pulp Corporation to meet Contract obligations for the remainder of the 1986-90 Operating Period and providing for a smooth transition to the next operating period. The SEIS time frame requires that the Forest Service avoid alternatives needing extensive road construction or new log transfer facilities that would involve new or additional permits. The second factor is the limited existing transportation network (road system) within Analysis Area 6. The project time frame constrains where the Forest Service could locate potential timber harvest units and the development of additional action alternatives.

WILDLIFE FINDINGS

The rural communities in the vicinity of Analysis Area 6 harvest a variety of wildlife resources. The 1987 Tongass Resource Use Cooperative Study found that wildlife made up 11 to 44 percent of the per-capita harvest of principal subsistence resources used by the rural communities in the vicinity of Analysis Area 6. The pounds per capita ranged from 26 in Klukwan to 156 in Hoonah.

Abundance or Redistribution

Deer

Deer are an important subsistence resource used by the rural communities in the vicinity of Analysis Area 6. The 1987 Tongass Resource Use Cooperative Study indicated that deer made up 5 to 39 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 6. The per-capita harvest of deer ranged from 13 pounds by Klukwan residents to 135 pounds by Tenakee Springs residents.

Table 4-37

Proposed Timber Harvest in Important Subsistence Areas (Unit Numbers)¹

Alternatives						
1	2	3	4	5	6	7
236-10	236-10	236-10	236-10	235-235	235-43	235-71
236-12	236-12	236-12	236-12	235-236	235-45	235-72
239-5	236-31	236-31	237-26	235-237	235-46	235-73
239-6	236-38	236-38	237-27	235-238	235-50	235-74
239-7	236-39	236-39	237-28	235-239	235-51	235-75
	236-40	236-40	237-29	235-240	235-52	236-10
	236-41	236-41	237-30	236-10	235-53	236-12
	236-47	236-47	237-31	236-12	235-54	236-31
	236-49	236-49	238-7	237-26	235-64	236-32
	239-5	238-7	238-8	237-27	235-67	236-34
	239-6	238-8	238-9	237-28	235-77	237-2
	239-7	238-9	238-10	237-29	235-104	237-26
	239-17	238-10	238-11	237-30	236-10	237-27
	239-59	238-11	238-12	237-31	236-12	237-29
	242-94	238-12	238-13	238-7	237-26	237-30
	242-95	238-13	238-14	238-8	237-27	238-1
	242-96	238-14	238-15	238-9	237-28	238-3
	242-218	238-15	238-16	238-10	237-29	238-4
	243-105	238-16	238-17W	238-11	237-30	238-5
	243-106	238-17W	238-17E	238-12	237-31	238-6
	243-108	238-17E	238-18	238-13	238-7	238-7
	243-109	238-18	238-19	238-14	238-8	238-8
	243-111	238-19	238-20	238-15	238-9	238-9
	243-113	238-20	238-21	238-16	238-10	238-10
	243-114	238-21	238-22	238-17W	238-11	238-11
	243-115	238-22	238-23	238-17E	238-12	238-12
	243-129	238-23	238-24	238-18	238-13	238-13
	243-130	238-24	238-25	238-19	238-14	238-14
	243-201	238-25	238-91	238-20	238-15	238-15
	243-203	238-91	238-101	238-21	238-16	238-16
	243-204	238-101	239-5	238-22	238-17W	239-5
		239-5	239-6	238-23	238-17E	239-6
		239-6	239-7	238-24	238-18	239-7
		239-7	242-94	238-25	238-19	239-17
		239-17	242-95	238-91	238-20	239-56
		239-59	242-96	238-101	238-21	239-59
		242-94	242-218	239-5	238-22	239-61

Continued

Table 4-37 (Continued)

**Proposed Timber Harvest in Important Subsistence Areas
(Unit Numbers)¹**

Alternatives						
1	2	3	4	5	6	7
		242-95	243-105	239-6	238-23	239-62
		242-96	243-106	239-7	238-24	242-94
		242-218	243-108	239-17	238-25	242-95
		243-105	243-109	240-234	238-91	242-96
		243-106	243-111	241-226	238-101	242-218
		243-109	243-113	241-227	239-5	243-105
		243-111	243-114	241-228	239-6	243-111
		243-113	243-115	241-229	239-7	243-113
		243-114	243-129	241-230	243-105	243-115
		243-115	243-130	241-231	243-106	243-129
				241-232	243-108	243-130
				241-233	243-109	244-125
				242-217	243-111	244-126
				242-218	243-129	244-148
				242-219	243-130	245-141
				242-220	243-200	245-142
				242-221	243-201	245-149
				242-222	243-202	245-150
				242-223	243-203	245-151
				242-224		245-152
				242-225		
				243-200		
				243-201		
				243-204		
				243-210		
				243-213		
				244-122		
				244-207		
				244-208		
				244-209		
				244-211		
				244-212		

SOURCE: SEIS Planning Record.

NOTE: Refer to alternative maps and the Importance Subsistence Use Area map folded at the back of this document.

¹ Unit numbers are shown by VCU then harvest unit numbers within that VCU. For example, 236-10 is harvest unit 6 in VCU 201.

Hearing testimony emphasized the importance of Analysis Area 6 for harvesting subsistence deer. Several people from Tenakee Springs who testified at the hearings expressed concern about the potential effects the action alternatives could have on deer and deer availability for subsistence needs. "There are years when we are extremely dependent on the subsistence resources in the inlet to survive."

"It's a very important subsistence source for deer...for Sitkans." (Sitka Hearing testimony.)

Chapter 3, Wildlife section, estimates that deer in Alaska Department of Fish and Game (ADF&G) Minor Harvest Area (MHA) 3627 (Figure 3-2), Analysis Area 6, are currently being harvested at levels greater than the current population can sustain. In 1987, the deer harvest in MHA 3308 was greater than the current population could sustain (Consolidated Appendix, Volume I, B-3). In fact, the 1987 deer harvest level in MHA 3308 and the 1988 deer harvest level in MHA 3627 are greater than what the estimated population could have sustained prior to any timber harvest. This assumes, as was pointed out in Chapter 3, that habitat capability projections from the deer model reflect an approximation of deer population. Further, it is based on the determination by ADF&G that the sustainable harvest is 10 percent of the deer population (ADF&G 1989).

It is assumed that actual deer harvest for 1987 and 1988 reflects rural and non-rural community demand for deer in MHAs 3308, 3627 and 3628 (Table 3-12). Based on this assumption, the current demand for deer by rural and non-rural communities exceeds the sustainable supply of deer in Minor Harvest Areas 3308 and 3627. Additional analysis of the 1987 and 1988 ADF&G hunting data indicates the current demand for deer by the rural communities alone exceeds the present sustainable supply of deer in MHA 3308. Thus, current deer abundance (abundance defined as ample deer available for harvest) is below the level needed by the rural communities harvesting deer in Minor Harvest Area 3308.

One hundred thirty-six proposed timber harvest units being considered in the action alternatives are located in the mapped important subsistence-use areas for deer (Alternative Maps, Important Subsistence Use Area Map and Table 4-37). The harvest of the proposed units will effect deer abundance in three of the MHAs in Analysis Area 6. The potential site-specific effects on deer habitat capability (deer habitat capability reflects potential deer abundance) are evaluated in the Wildlife section.

The deer habitat capability analysis in Chapter 3, Wildlife section, indicates past activities have reduced deer habitat capability from less than one percent in MHA 3628 to approximately nineteen percent in MHA 3308 (Table 3-13). The effect on deer abundance from past activities is substantial in MHA 3308.

The analysis in Chapter 4, Wildlife section, indicates that proposed project action alternative effects on habitat capability in Analysis Area 6 range from no effect for Alternatives 2, 3, and 4 in MHA 3628 to approximately a 7 percent reduction for Alternative 3 in MHA 3627 (Table 4-13). Timber harvest proposed in MHA 3308 could reduce habitat capability about another 1 to 3 percent and would increase the cumulative reduction to over 20 percent. This would further increase the substantial reduction in deer abundance.

The deer habitat capability decreases further when effects of past timber harvest are combined with project effects and are carried into the foreseeable future in Analysis Area 6 (Figure 4-2). The reduction in MHA 3227 ranges from just over 7 percent in Alternative 1 to nearly 24 percent in Alternative 6. The reduction in MHA 3308 ranges from 19 percent in Alternative 1 to nearly 26 percent in Alternative 5. Effects on deer abundance are substantial in MHA 3308 for Alternatives 1, 2, 3, 4, 5, 6, and 7 and in MHA 3627 for Alternatives 4, 5, 6, and 7.

Foreseeable changes in local deer herd distribution are expected in VCUs 236, 237, and 238 in MHA 3627 and in VCUs 239, 240, 241, 242, 243, 244, and 245 in MHA 3308 when the age of the second growth on the past and proposed timber harvest units reaches twenty-five years. This conclusion is based on deer habitat utilization studies in Southeast Alaska.

Furbearers

Furbearers are presently being trapped in Analysis Area 6 (Tables 3-16 and 3-18). The Forest Service has no information on how many of the trappers harvesting pine marten, land otters, and other furbearers are from rural communities surrounding Analysis Area 6. The evaluation assumes most of the trappers are from the surrounding rural communities.

Concern for furbearers is apparent in the hearing testimony. "Another thing that logging has destroyed Sitkoh Bay's--are the fur-bearing animals...We have beavers starting to come back. When the logging company moved in and started logging this area, they decimated the beaver that were there. Presently now we have beaver around the back side towards Florence Bay, back towards Basket Bay, that have started to come back...That means they're starting to build back up and get--reclaim some of their areas that they had been killed out--off of." In Chapter 3, Wildlife section, pine marten were selected as an indicator of potential project effects on furbearers. Past timber harvest and road construction activities on National Forest and private lands within Analysis Area 6 have reduced pine marten habitat capability from 450 pine martens in 1961 to 246 today. This represents a 45 percent reduction in habitat capability (Table 3-17). Pine marten habitat capability is assumed to reflect potential pine marten abundance and furbearer abundance. The projected 45 percent reduction in pine marten habitat capability indicates the potential reduction in pine marten and furbearer abundance from past activities is substantial.

Fifteen proposed timber harvest units in the action alternatives are located in mapped important furbearer subsistence-use areas in Analysis Area 6 (Alternative Maps, Important Subsistence Use Area Map and Table 4-37). The Wildlife section analysis indicates the proposed timber harvest and road construction in the action alternatives would potentially reduce pine habitat capability an additional 16 to 49 percent in MHA 3627, zero to 5 percent in MHA 3628, and about 1 percent in MHA 3308 (Table 4-17).

Cumulative effects from past and proposed actions indicate potential pine marten habitat capability reductions in ADF&G MHAs within Analysis Area 6 range from a 46 to 56 percent reduction (Figure 4-6). The cumulative effects from past and proposed actions are even pronounced in the individual Minor Harvest Areas. In MHA 3627, for example, the potential reduction in habitat capability ranges from 38 to 71 percent when the 22 percent reduction from past activities is added to the potential project effects (Table 3-17). The proposed actions add to what is already considered a substantial reduction in potential pine marten and furbearer abundance.

The foreseeable effects on pine marten and furbearer abundance in Analysis Area 6 from past and proposed activities would be offset by the allowing roads to close naturally (Figure 4-6).

Changes in local furbearer distribution are also expected to be substantial as a result of past and proposed timber harvest. Additional effects on local distribution will occur as the second growth in these timber harvest units reaches about 25 years old. Timber harvest and regrowth of second growth in these harvest units alter furbearer habitat-use patterns.

The resulting benefits of proposed road mitigation would offset some of the past and proposed project cumulative effects (Figure 4-7). But the benefits would not be enough to offset the substantial reduction in potential pine marten abundance in Analysis Area 6 resulting from past and proposed activities on National Forest lands.

Other mitigation measures may be necessary to maintain viable pine marten populations in ADF&G MHAs 3308 and 3627. Forest Service and Alaska Department of Fish and Game wildlife biologists estimate a population of 50 pine martens are needed in a Minor Harvest Area to maintain a viable population. Possible measures include closing the trapping season, limiting the number of traps per trapper, limiting the use of motorized vehicles while trapping, and regulating the use of ORVs and other motorized vehicles.



Waterfowl

A variety of waterfowl from Kadashan Bay and Sitkoh Bay are harvested by the rural communities using Analysis Area 6. Hearing testimony affirmed the importance of these areas for harvesting waterfowl and expressed concern about the effects of the proposed timber harvest would have on waterfowl in the Sitkoh Creek area (Consolidated Appendix, Volume I, B).

The analysis in the Wildlife section indicates the action alternatives do not propose timber harvest in inland wetland habitat. Because there will be no effect on inland wetland habitat, waterfowl abundance and distribution is expected to remain unchanged in Analysis Area 6.

Brown bear

Residents of rural communities within ADF&G Game Management Unit 4 and the residents from the community of Kake are allowed to harvest brown bears for subsistence purposes. Analysis Area 6 is within Game Management Area 4. Chapter 3, Table 3-14, displays the brown bear harvest in Analysis Area 6 since 1980. The Forest Service has no data on how many of those bears were harvested by residents of rural communities.

Several people who testified at the Subsistence Hearings in Gustavus and Hoonah expressed concern about the potential project effects on the brown bear. "We found a direct correlation between the amount of timber harvested and the number of bears killed for sport and in defense and illegally...Last year we surveyed hunters that had killed brown bear, sport hunters that had killed brown bear in the northeast Chichagof area and we found that over eighty percent of those bears that were taken were taken at the dump or within a quarter mile of the dump...Another note I'll add is the brown bear is one species already threatened by extinction on Chichagof Island, a territorial creature like the Tlingit people."

Chapter 3, Wildlife section, notes that nearly a 37 percent reduction in brown habitat capability (Table 3-15) has resulted from past timber harvest and road construction activities on National Forest lands in Analysis Area 6. The reduction in the ADF&G Minor Harvest Areas

within Analysis Area 6 ranges from 17 percent to 46 percent. Brown bear habitat capability is assumed to reflect potential brown bear abundance. The overall reduction in brown bear habitat capability indicates the potential reduction in brown bear abundance from past activities is substantial.

The Wildlife section analysis indicates the proposed timber harvest and road construction in the action alternatives would potentially reduce brown bear habitat capability another 1 to 12 percent in Analysis Area 6 (Table 4-15). When added to the past effects, the habitat capability reduction would range from 38 percent for Alternative 2 to 48 percent for Alternative 6. This reduction adds to what is already considered a substantial reduction in potential brown bear abundance in Analysis Area 6.

Cumulative effects to brown bear habitat capability in Minor Harvest Areas in Analysis Area 6 from past and proposed activities present a more site-specific picture of what is occurring. The potential cumulative reduction in habitat capability in MHA 3627 ranges from 35 percent for Alternative 2 to 68 percent for Alternative 6. It ranges from zero to 26 reduction in MHA 3628. It ranges from 47 percent for Alternative 2 to 50 percent for Alternative 5 in MHA 3308 (Table 4-15).

The resulting benefits of proposed road mitigation would offset some of the past and proposed project cumulative effects (Figure 4-4). But the benefits would not be enough to offset the substantial reduction in potential brown bear abundance in Analysis Area 6 resulting from past and proposed activities on National Forest lands.

Changes in local brown bear distribution will occur in the vicinity of on-going activities during the life of the proposed project as brown bears tend to avoid contact with people. They tend to move back into these areas, however, after timber harvest is completed. Foreseeable changes in local brown bear distribution are expected in MHAs 3308, 3627, and 3628 when the age of the second growth on the past and proposed timber harvest units reaches about twenty-five years.

Marine Mammals

Federal law prohibits the taking of marine mammals by anyone other than Native hunters. There is no evidence that timber harvest activities have had any effects on marine mammals. Therefore, there would be no possibility of a significant restriction in subsistence use of marine mammals by the rural communities surrounding Analysis Area 6.

Access

Access to historic subsistence-use areas has not been affected by past land-use activities and will not be affected by any of the proposed alternatives. Nor is there a substantial chance it would be affected in the foreseeable future due to activities proposed in this project. This is because traditional access by foot, boat, or float plane would remain the same.

Roads radiating from the Corner Bay, False Island, Sitkoh Bay East, Sitkoh Bay West and Todd log transfer facilities (LTFs) have provided another means of access to much of Analysis Area 6. These roads open up areas that were not previously used for harvesting subsistence wildlife resources. Future residents residing at the logging camps at Corner Bay and False Island would benefit from the road access in much of Analysis Area 6. The road construction associated with the proposed timber harvest alternatives would increase access into areas not traditionally used as subsistence wildlife harvest areas (Alternative Maps).

Presently, a boat or barge is needed to transport motorized vehicles to the road systems radiating from the LTFs in Analysis Area 6. Some hunters and trappers are using the roads in the analysis area. The 1987 TRUCS map data and the Analysis Area 6 Important Subsistence Use Area Map reflect the use of the road corridors. Three-wheelers and snowmobiles have been transported by skiff to road access points. In the past, some Tenakee residents have spotted a motor vehicle at Corner Bay for accessing the interior of Analysis Area 6 (Leghorn and Kookesh 1987).

A portion of the hearing testimony in Tenakee Springs centered around the cons of increased road access into wildlife subsistence use areas. "My husband's hunting habitats have changed since we moved to Tenakee. He now avoids the Indian River area that he used to hunt regularly but is now heavily hunted by three-wheeler hunters....Alternative No. 4. This alternative would connect--on the Corner Bay road system, would connect the Kadashan to Sitkoh Lake/Sitkoh Bay road system....This would have a real devastating effect to a really important area to me, which is Kadashan....So people could drive over from logging camps and right into Kadashan."

In Analysis Area 6, the Final SEIS proposes to allow the natural process of vegetative growth to close off access on secondary roads. This would occur after the proposed project is completed. The purpose of this is to mitigate the cumulative past, proposed, and foreseeable future effects on brown bear and pine marten. This will assist maintenance of viable populations of both species in portions of Analysis Area 6. In the short term, this will have no effect on access to subsistence-use areas now available from existing roads. Also, it will have no effect on new potential use areas that will be made available from roads proposed for construction in this project. In the foreseeable future, access to these wildlife subsistence-use areas, however, will be reduced as the roads naturally fill in with alder and other vegetative growth. To the subsistence users who learn to depend on these roads, the loss could be substantial. They would have to find another way to reach the areas or use traditional means to access other surrounding subsistence-use areas.

Competition

Competition for wildlife resources on southeast Chichagof Island is an issue to rural community residents using Analysis Area 6. Tenakee Springs testimony reflected concern that the connecting road from False Island to Kadashan would increase competition for resources they presently harvest. From the Angoon testimony, concern was expressed that competition for subsistence wildlife resources would increase in their immediate surrounding area as the abundance of wildlife subsistence resources are reduced because of land management activities.

Data were provided at the Hoonah hearing that displayed 1987 deer harvest by community. This data presented in Table 4-38, and the recently available 1988 deer harvest data presented in Table 4-39, support the concern that non-rural hunters are harvesting a substantial number of deer on southeast Chichagof Island. The level of non-rural deer harvest is occurring even though there is no direct Alaska Marine Highway service to Analysis Area 6. The testimony also shows there is concern that other rural community residents are harvesting deer in this area.

In Tenakee Springs hearing testimony, concern was expressed about competing for the subsistence resources in Analysis Area 6 with future residents of the logging camps at Corner Bay

Table 4-38

1987 Deer Harvest for ADF&G Minor Harvest Areas 3308, 3627, and 3628

MHA	Deer Harvested			Percent Harvested	
	<i>Rural</i>	<i>Non-rural</i>	<i>Total</i>	<i>Rural</i>	<i>Non-rural</i>
3308	291	70	361	81	19
3627	2	44	46	4	96
3628	22	20	42	52	48
Total	315	134	449	70	30

Table 4-39

1988 Deer Harvest for ADF&G Minor Harvest Areas 3308, 3627, and 3628

MHA	Deer Harvested			Percent Harvested	
	<i>Rural</i>	<i>Non-rural</i>	<i>Total</i>	<i>Rural</i>	<i>Non-rural</i>
3308	136	50	186	73	27
3627	31	80	111	28	72
3628	27	44	71	38	62
Total	194	174	368	53	47

and False Island. The Final SEIS recognizes some increased competition could occur for wildlife resources. Some future residents of the logging camps, however, have and would meet residency requirements. If they met residency requirements, they would qualify as subsistence users. It is possible, though, that some camp residents would be Alaska nonresidents and non-rural residents. Most non-rural and Alaska nonresidents are employed seasonally by the logging companies and leave prior to peak hunting times.

At some point, the Alaska Board of Game may have to use its authority to regulate non-subsistence uses of deer due to the competition for deer in Sitkoh Bay, Corner Bay/Trap Bay, and Kadashan Bay in ADF&G MHAs 3308, 3627, and 3628. They may also have to prioritize the harvest of deer among the rural communities whose residents are harvesting deer in these three minor harvest areas. This type of action, as prescribed by ANILCA Section 804, may be necessary to ensure the availability of adequate abundance of deer needed by the rural communities using southeast Chichagof Island.

People testifying at the Angoon Hearing said, "You ignore the regional aspect of subsistence.... You ignore the growing competition for those areas not logged, such as Admiralty.. A lot of times we were accused of being stingy with our island. But everybody is coming now, everybody who's area is over-logged is coming to our area to hunt." Sustainable deer abundance in two MHAs in Analysis Area 6 is presently below the level needed to meet deer demand. Potential reduction in deer abundance from past and proposed land-use activities and the foreseeable effects from those activities is substantial in those same MHAs. The cumulative effects on brown bear and pine marten habitat capability from past and proposed activities will substantially reduce abundance of brown bear and furbearers in Analysis Area 6.

Finding

The above analysis leads to the conclusion that the actions proposed in Alternatives 1, 2, 3, 4, 5, 6, and 7 do present a significant possibility of a significant restriction of subsistence use of wildlife in Analysis Area 6. That finding is based on the potential resource effects by the three evaluation categories shown in Table 4-40. "Yes" indicates a significant possibility of a substantial effect and "no" indicates an insignificant possibility of a substantial effect.

FISH AND SHELLFISH FINDINGS

Fish and shellfish are an important subsistence resource used by the rural communities in the vicinity of Analysis Area 6. The 1987 Tongass Resource Use Cooperative Study indicated fish and shellfish made up 55 to 86 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 6. The pounds per capita ranged from 95 in Sitka to 250 in Port Protection.

Two proposed harvests units are in the mapped important salmon subsistence-use areas (Alternative Maps, Important Subsistence Use Area Map and Table 4-37).

Table 4-40

Significant Possibility of a Significant Restriction of Subsistence Use of Wildlife Resources¹

	Alternative						
	1	2	3	4	5	6	7
Abundance or Distribution	yes	yes	yes	yes	yes	yes	yes
Access	no	no	no	no	no	no	no
Competition	yes	yes	yes	yes	yes	yes	yes

¹ "No" indicates an insignificant possibility of a substantial effect. "Yes" indicates a significant possibility of a substantial effect.

Abundance and Distribution

Salmon

Salmon are a major subsistence food harvested by residents of the rural communities surrounding Analysis Area 6. The per-capita harvest of salmon ranged from 30 pounds by Wrangell residents to 124 pounds by Klukwan.

A common theme expressed at the hearings was a concern for salmon spawning and rearing habitat. The testimony focused on the Sitkoh Bay area: "I opposed the logging round the lake. the removal of all growth would raise the temperature of the lake...The creek itself, the Sitkoh sockeye creek, used to have nice, clean gravel bottom. After the logging was finished, or even during the logging operation, the needles and sawdust and bark and rotten vegetation that was entering the lake and into the creek caused the form of algae in that creek to where you couldn't hardly stand...Sitkoh Lake has been previous logged around part of it...The side facing southeast has been logged up above on the hillside. There has been some recent slides." Testimony indicated loam from the over-burden that slid into the lake had a tendency to float on the surface. "This loam had floated back--had washed down and had come--there were some--the sockeye spawn in these areas back in these gravel areas, or shallow areas, where some of this loam has come into, especially where the creek areas run out and build up a gravel area, and that loam has covered some of their spawning areas...We object to further logging activities in Sitkoh Bay or surrounding area or using the area for log dumps...This year, sockeye season was very poor...And how many bays have we destroyed already by extensive logging?....We eat from the creek. Where the log falls, barks and what not from the tree laying all over the ground. When the sun comes up, it forms acid, and it gets more stronger. When the rain comes, all the water and acid goes in the creek. What fish eats in the creek and the river where they are logging kills all the fish food in it, and it turns different, different color in the river. Where the fish spawns, the logger's the ones that destroying all our food subsistence."

The Fisheries section concludes that potential effects of the proposed timber harvest and road construction alternatives on salmon spawning and rearing habitat would be minimal or eliminated by applying the Forest Service standards, guidelines, and prescriptions, described in detail in the Aquatic Habitat Management Handbook (AHMU). All proposed timber harvest units near salmon spawning and rearing streams are protected by buffers of at least 100 feet except for a few Class II streams with 50 foot buffers. (Alternative Maps). Specific AHMU prescriptions are in Appendix A-1 for all the proposed cutting units near or within the AHMU boundaries.

Based on the implementation of these site-specific prescriptions for protecting salmon spawning and rearing habitat, the FEIS projects that the immediate and foreseeable effects on the

abundance and distribution of salmon for subsistence uses in Analysis Area 6 would not be measurable.

Other Finfish

The action alternatives for the proposed project would have no immediate or foreseeable impact on other finfish habitat. Since there would be no impact on other finfish habitat, the abundance and distribution of those other finfish would not be affected.

Shellfish

At the Angoon Hearing some people testified that in the Sitkoh Bay and Tenakee Inlet area, crabs and other shellfish are not as plentiful as in the past. They attributed the decline to the effects of logging and over-harvesting.

In evaluating the potential effects of proposed timber harvest, road construction, and log transfer facility reconstruction on habitat for crabs, clams, and other shellfish, it was determined that Alternative 1 would have no measurable effect. The Marine Environment section indicates the potential deleterious effects from reconstruction and operation of existing log transfer facilities in Sitkoh Bay and Todd and using the Corner Bay LTF proposed in the action Alternatives 2, 3, 5, and 7, will be small incremental additions to existing bark deposits. Their operation would result in small effects to benthic organisms. Based on this, the effect on the abundance and distribution of local crabs, clams, and other shellfish would not be measurable. The project effects for the foreseeable future would also not be measurable.

Access

Access to historic subsistence-use fishing areas has not been affected by past land-use activities and would not be affected by any of the proposed alternatives. Nor is there a significant possibility it would be affected in the foreseeable future due to activities proposed in this project. This is because traditional access by foot or boat would remain the same. Although logging roads may provide access to reaches of streams that were not previously used for harvesting subsistence salmon, the Forest Service is not aware of any residents from the surrounding rural communities who are currently using the roads to access reaches of salmon streams in the analysis area to harvest salmon. (See previous discussion on access.)

The Final SEIS proposes to let all secondary roads close naturally in Analysis Area 6 after the project is completed.

The effect on access to salmon and other fin fish harvest areas on National Forest lands in Analysis Area 6 from the natural road closures is not expected to be substantial. This is based on current information which suggests the roads in the analysis area are not being used extensively to access salmon, other fin fish and shellfish harvesting areas. There are also ample opportunities to harvest salmon, shellfish and other fin fish in surrounding areas.

Competition

The Phase II Draft SEIS concluded that although there was potential for competition for salmon from Corner Bay and False Island logging camp residents, there was no evidence of conflicting use for those fish. None of the written comments on the Draft or the testimony given at the hearings indicate salmon availability to subsistence users is being affected by sport harvest and non-rural harvest. At the Angoon and Sitka hearings, some people who testified believed part of the reason why crabs and other shellfish were not as plentiful as in past years in the Basket Bay, Sitkoh Bay, Tenakee Inlet, was from over-harvesting. Testimony from both communities expressed the importance of the sockeye salmon subsistence fishery in Sitkoh Bay and in the creeks flowing into the bay. There is competition for those fish. Angoon users were given first priority at a recent State Fish Board Meeting.

As indicated in the discussion concerning competition for wildlife, there may be some increased competition for subsistence resources from rural residents, Alaska nonresidents and



Minnie Johnson was a Master Weaver of Traditional Tlingit Baskets

non-rural residents employed at Corner Bay and False Island logging camps. The increase in competition from non-rural residents and Alaska nonresidents would not be substantial due to the availability of fish resources in the immediate vicinity and in the surrounding areas.

Finding

The analysis concludes that the actions proposed in Alternatives 1, 2, 3, 4, 5, 6, and 7 do not present a significant possibility of a significant restriction of subsistence use of fish and shellfish in Analysis Area 6. That finding is based on the potential resource effects by the three evaluation categories shown in Table 4-41. "Yes" indicates a significant possibility of a substantial effect and "no" indicates an insignificant possibility of a substantial effect.

OTHER FOODS FINDING

Information and data from the Tongass Resource Use Cooperative Study (TRUCS) and the Subsistence Hearings have provided the Forest Service with additional information concerning the gathering of other foods by rural communities using Analysis Area 6. Other foods include plants such as kelp, goose tongue, a variety of berries, etc. Though other foods did not constitute a major portion of the 1987 subsistence harvest by the rural communities documented in TRUCS, they are considered subsistence resources. The TRUCS indicated plants made up 2.0 to 7.5 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 6. The pounds per capita ranged from 3.3 in Wrangell to 23 in Port Alexander.

Abundance and Distribution

Most traditional other food gathering occurs near beach and estuarine areas. Timber harvest units and road construction proposed in action Alternatives 2, 5, and 6 in Analysis Area 6 would infringe upon beach areas that are potentially used for other food gathering (Table 4-42). The availability of numerous other food gathering areas in the immediate vicinity would negate the potential impact to rural community residents using those areas.

The timber harvest and road construction activity would improve the availability of berries in the short-term wherever activity is proposed in the action alternatives. Based on this increase of berries and the availability of surrounding areas for other food gathering, the project effects and the project foreseeable effects from the proposed action alternatives are not expected to substantially affect the abundance and distribution of other foods.

Access

Access to traditional other food gathering areas has not been affected by past land-use activities and will not be affected by any of the proposed alternatives. Nor is there significant pos-

Table 4-41

Significant Possibility of a Significant Restriction of Subsistence Use of Fish Resources

	Alternative						
	1	2	3	4	5	6	7
Abundance or							
Distribution	no	no	no	no	no	no	no
Access	no	no	no	no	no	no	no
Competition	no	no	no	no	no	no	no

¹ "No" indicates an insignificant possibility of a substantial effect. "Yes" indicates a significant possibility of a substantial effect.

Table 4-42
Proposed Timber Harvest Units Located In or Adjacent to Potential Beach Gathering Areas for Other Food Resources

		Alternative			
2		5		6	
VCU 243	Unit 201	VCU 240	Unit 234	VCU 243	Units:
		VCU 241	Units:		200, 201
			228, 229		
			230, 231		
			232, 233		
		VCU 242	Unit 221		
		VCU 243	Units:		
			200, 201		

sibility it would be affected in the foreseeable future due to activities proposed in this project. This is because traditional access by boat, foot, or float plane would remain the same.

Roads radiating from the Corner Bay, False Island, Sitkoh Bay East, Sitkoh Bay West and Todd log transfer facilities (LTFs) have provided another means of access to much of Analysis Area 6. These roads access areas that were not traditionally used for other food gathering. The Forest Service is not aware of any residents from the surrounding rural communities who are currently using the roads to access other food gathering sites in the analysis area. (See previous discussion on access.)

Gathering One of a Variety of Food Items from the Forest



The Final SEIS proposes to let all secondary roads close naturally in Analysis Area 6 after the project is completed.

The effect of the loss of access to the other food gathering areas due to the natural road closures, however, is not expect to be substantial. There are ample opportunities for food gathering in surrounding areas.

Competition

No concern about competition for other foods was expressed at the subsistence hearings or in the written comments received on the Draft SEIS for Analysis Area 6.

As indicated in the discussion concerning competition for wildlife, there may be some increased competition for subsistence other food resources from rural residents, Alaska nonresidents and non-rural residents employed at the logging camps at Corner Bay and False Island. The increase in competition from non-rural residents and Alaska nonresidents, however, would not be substantial due to the availability other food gathering sites in Analysis Area 6 and the surrounding areas.

Finding

The analysis concludes that the actions proposed in Alternatives 1, 2, 3, 4, 5, 6, and 7 do not present a significant possibility of a significant restriction of subsistence use of other food resources in Analysis Area 6. That finding is based on the potential resource effects by the three evaluation categories shown in Table 4-43. "Yes" indicates a significant possibility of a substantial effect and "no" indicates an insignificant possibility of a substantial effect.

TIMBER FINDING

The Forest Service personal free use policies in Alaska for firewood and timber remain unchanged from the 1986-90 Operating Period EIS for the APC Long-Term Sale. Since the Forest Service policy is still in effect, the proposed alternatives for Analysis Area 6 will have no effect on the availability of firewood and personal-use timber.

Mitigation

Because most subsistence use involves the harvesting of fish and game, mitigation measures that protect or enhance fish and game resources will also protect and enhance subsistence activities. Mitigation measures are built into each of the action alternatives considered in this SEIS. These specific measures are detailed on the unit cards in Appendix A-1 and also at the end of this chapter in the mitigation section, and are briefly summarized here.

Table 4-43

Significant Possibility of a Significant Restriction of Subsistence Use of Other Food Resources

	Alternatives						
	1	2	3	4	5	6	7
Abundance or							
Distribution	no	no	no	no	no	no	no
Access	no	no	no	no	no	no	no
Competition	no	no	no	no	no	no	no

¹ "No" indicates an insignificant possibility of a substantial effect. "Yes" indicates a significant possibility of a substantial effect.

Fish habitat is protected in each alternative through the application of AHMU prescriptions along every Class I and II stream as well as along some Class III streams. AHMU prescriptions, in addition to protecting fish habitat, also protect riparian habitat important to other species such as deer, bears, and furbearers.

Mitigation to enhance deer habitat in second growth stands following timber harvest includes thinning to a wider than normal spacing which is designed to improve forage. Thinning to a wider standard has been successfully employed in Southeast Alaska.

Another form of mitigation, which is built into the design of the alternatives, is the location of the harvest units. Harvest units are intentionally located away from important fish and old growth habitat, to the extent practicable, to reduce effects on these habitats. The proximity to prior harvest units is also considered so as to reduce cumulative effects, particularly as they relate to successive harvests within a single watershed. Beach fringes and estuarian habitats are also avoided as much as possible.

Although not directly related to subsistence, there was concern expressed at the subsistence hearings by Alaska Natives about the protection of cultural resources. Mitigation designed to protect cultural resources includes additional field reconnaissance of any areas with a moderate, or higher, probability of cultural resource presence. In addition, the Timber Sale Contract provides authority to suspend timber harvest or road construction activities on sites where cultural resources are discovered.

The Final SEIS evaluates the reasonably foreseeable future effects of each alternative. It also evaluates projected programmatic and cumulative long-term effects associated with continued implementation of the Forest Plan. The Subsistence Evaluation considers both types of long-term effects. The Forest Service is uncertain about the site-specific locations of future activities associated with long-term programmatic projections. The precise location of future projects is not clearly known until a project is proposed. The Subsistence Evaluation for long-term programmatic effects concludes whether or not future activities may restrict subsistence uses.

The 1986-90 Operating Period Life of Sale Plan (Analysis) projects that an additional 25,000 acres of timber will be harvested from the VCUs in Analysis Area 6 by 2011. Under TLMP prescriptions for this same area, 46,000 acres are scheduled for timber harvest by 2080.

The Wildlife and Fisheries sections project this level of harvest would affect the habitat capability of several wildlife species and may also affect the habitat capability of some salmon species. The changes in habitat capability could affect their abundance and distribution. The potential decrease in abundance could increase competition for those species. Most of these species are important subsistence resources used by the rural communities surrounding the Analysis Area. Actions on other lands surrounding the analysis area could also affect the abundance or distribution, access to, and competition for the subsistence resources harvested by the rural communities using Analysis Area 6.

Enough is known about Forest Service programmatic activities and potentially foreseeable activities on other lands surrounding Analysis Area 6 to project that subsistence uses may be significantly restricted in the future.

The Forest Service is revising TLMP through the NEPA process. Potential effects to subsistence users will be addressed during the revision. Future project environmental analyses will be required prior to harvest of any additional timber beyond the amount proposed in this project. Subsistence use effects will be evaluated in those analyses.

Should subsistence resources become limiting at some point, the Alaska Board of Game has the authority to regulate non-subsistence uses of these resources. This type of action, as prescribed by ANILCA Section 804, may be necessary to ensure the availability of adequate subsistence resources needed by the rural communities using southeast Chichagof Island.

Reasonably Foreseeable, Long-Term, and Cumulative Programmatic Effects



Final Conclusions

Section 810 (a) (3) of ANILCA states that when a use, occupancy, or disposition of federal lands significantly restricts subsistence uses, determinations also must be made that the proposed action (1) is necessary, consistent with sound management of public lands, (2) involves the minimum amount of public lands necessary to accomplish its purpose and (3) reasonable steps will be taken to minimize adverse impacts on subsistence uses and subsistence resources resulting from the action. As stated in the Final SEIS findings above:

- (a) The potential foreseeable effects from the action alternatives of the proposed project in Analysis Area 6 present a no, or only slight significant possibility of a significant restriction of subsistence uses of fish, shellfish, timber and other foods.
- (b) The potential effects from the action alternatives of the proposed project in Analysis Area 6 present a significant possibility of a significant restriction of subsistence uses of wildlife.

The Final SEIS findings further project subsistence use may be significantly restricted in Analysis Area 6 from the results of implementing long-term management direction in the Tongass Land Management Plan, from future actions on other surrounding lands, and from adding those potential effects to the foreseeable effects of the proposed action.

Necessity (Consistent With Sound Management of Public Lands)

The actions proposed in this document have been examined to determine whether they are necessary, consistent with the sound management of public lands, to meet APC Contract obligations and achieve multiple use management objectives in the Tongass Land Management Plan. Standards used for the review include (1) the National Forest Management Act of 1976 and its implementing regulations; (2) the Alaska National Interest Land Conservation Act; (3) the Alaska Regional Guide; (4) the Tongass Land Management Plan; (5) the Alaska State Forest Practice Act; and (6) the Alaska Coastal Management Program.

Based on the analyses presented in Chapters 1, 2, and 4, the selected alternative (Proposed Action) is necessary and consistent with the sound management of public lands.

Amount of Land

The amount of land necessary to undertake the proposed action could be lessened somewhat by concentrating harvest in higher volume stands. The higher volume stands, however, are those most valuable as fish and wildlife habitat. The alternatives represent a balance between impacting the fewest acres, meeting existing contract commitments, and minimizing impacts on other resources. Thus the minimum amount of public land necessary to meet the proposed action's purpose is involved consistent with the standards referenced above.

Steps Taken to Minimize Adverse Actions on Subsistence Uses and Resources

Chapter 2, displays the Standards and Guidelines and Mitigation Measures which will be implemented as part of the selected alternative. Most are designed to maintain fish and wildlife habitat productivity at as high a level as possible, consistent with meeting existing timber harvest contract commitments.

Other Environmental Considerations

Unavoidable Adverse Environmental Impacts

Unavoidable adverse environmental effects are those effects resulting from resource use and development that cannot be effectively mitigated or avoided if the proposed action is to take place. Significant adverse consequences are eliminated or lessened through site planning, use of mitigation measures, and employment of standards or guidelines. These consequences are discussed earlier in this chapter. Remaining unavoidable consequences include: increased soil erosion and soil productivity loss beyond naturally occurring levels; local and short-term reductions in water and air quality; alteration of natural landscapes; increased competition for subsistence resources; loss of the primitive character of roadless areas that are entered; loss of opportunities for wilderness designation of areas being entered; and the disturbance or loss of some wildlife habitat. The intensity and duration of these effects depends on the alternative and the mitigation measures applied to protect the resources.

Most unavoidable effects are expected to be short term (usually less than two years). In all cases, the effects would be managed to comply with established legal limits, such as a maximum time for regeneration. In order to check and reduce these effects, monitoring procedures and mitigation measures have been planned for those areas that may be affected. Certain monitoring procedures and mitigation measures are required by existing standards or guidelines. Specific measures for each unit are included on the Unit Cards in Appendix A-1.

Relationship Between Short-Term Uses and Long- Term Productivity

All alternatives would come under the mandate of the Multiple Use and Sustained Yield Act of 1969, which requires the Forest Service to manage National Forest lands for multiple uses, including timber, recreation, fish and wildlife, range, and watershed. All renewable resources are to be managed such that they are available for future generations. The harvesting and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be reestablished and grow again if the productivity of the land is not impaired. To ensure adequate production of timber, harvest has been scheduled to allow the earliest cut stands to mature into merchantable timber before the planned harvest of original stands is complete. When the first rotation is complete, mature merchantable stands would be harvested again on a new rotation. Mitigation measures, which are recorded on individual harvest unit and road cards, are planned under all the alternatives to ensure future availability of other renewable resources as well.

Irreversible and Irretrievable Commitments of Resources

Nonrenewable resources would be committed under all of the action alternatives. These resources include energy resources and rock removed for road and facility construction. The No Action Alternative would not affect nonrenewable resources.

The action alternatives would result in some irretrievable losses, including some, but not all, mature and overmature stands, where some types of wildlife habitat and primitive recreation

4 Environmental Consequences

opportunities exist. These losses are quantified for each alternative earlier in this chapter of the EIS. Although these losses may be considered irretrievable for practical purposes under the TLMP and Life of Sale Plan, these resources will eventually re-establish if left undisturbed.

All of the alternatives are designed to conform to applicable laws, regulations, and standards regarding conservation of depletable natural resources.

Possible Conflicts Between the Alternatives and Other Land Use Objectives

The major land use regulations of concern are the Alaska Coastal Zone Management Act and Section 810 of ANILCA. Portions of this project that directly affect the coastal zone have been evaluated by the Forest Service and found to be consistent with the requirements of the Alaska Coastal Zone Management Act.

Under Section 810 of ANILCA, agencies are required to evaluate the effects of proposed actions on subsistence uses of federal land and to determine if the proposed action may significantly restricts subsistence opportunities. Refer to the sections on Wildlife and Subsistence of this chapter for the evaluation of impacts to subsistence uses as a result of the alternatives.

Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment

Analysis Area 6 contains no urban areas and very little built-up area of any kind. Therefore, the only applicable concern under this topic is with historic and cultural resources. The goal of the Forest Service's Cultural Resource Management Program is to preserve significant cultural resources in their field setting and ensure they are available in the future for research, social/cultural purposes, recreation, and education. The direct and indirect effects of the alternatives on cultural resources have been evaluated and determined to meet the program goals.

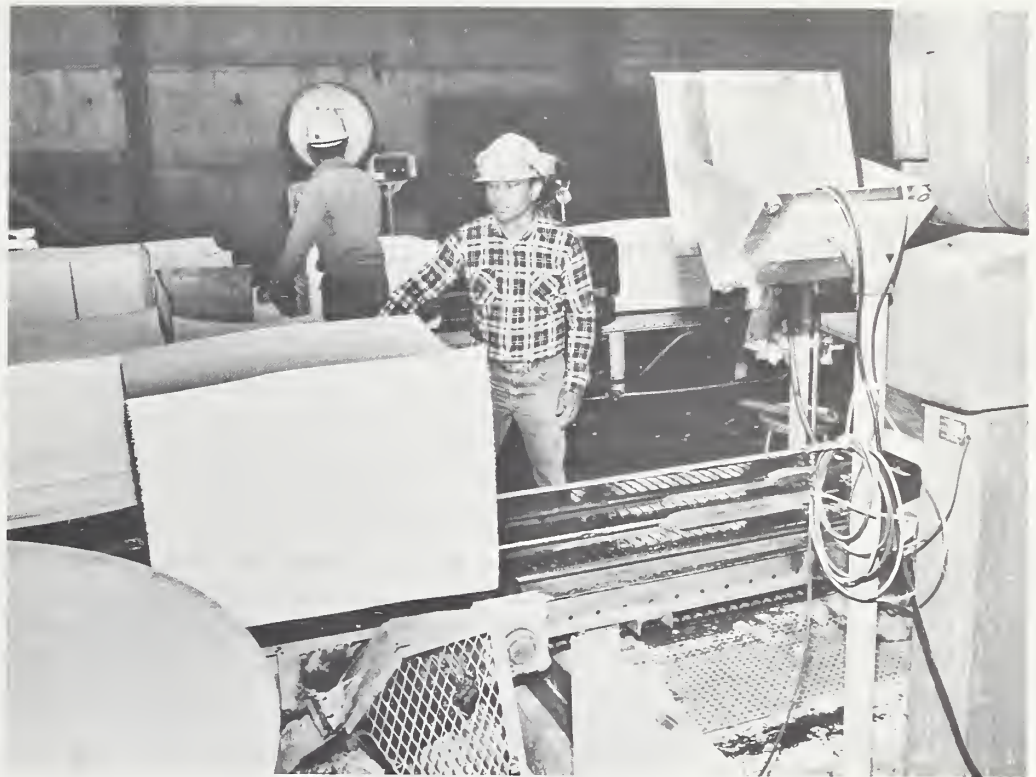
Mitigation

The Forest Service uses numerous mitigation, enhancement, and preventative measures in day-to-day practice (e.g., Forest Service Handbook 2609.24 on aquatic habitat management, Forest Service 1986a). These measures are employed for a variety of reasons such as fish and wildlife habitat protection or enhancement, protection of aesthetic values, prevention of landslides, prevention of windthrow, and timber stand improvement. In the 1986-90 FEIS, beginning on page 2-66 (Forest Service 1986b), the standards, guidelines, monitoring, and mitigation measures were discussed in some detail, especially for measures that protect the fisheries resource, such as development of Aquatic Habitat Management Units.

The application of these measures begins during the planning phases of a project, links to the overall Forest, Chatham Area, and Ranger District management plans, and continues through all phases of subsequent forest management. The first objective is to foresee and avoid or prevent a potential problem in the planning phases. For example, roads are not planned for slopes steeper than 75 percent or on high hazard soils. Also, the Tongass Land Management Plan land use designations identified areas of the Forest with the highest amenity values and set them aside from timber harvest activities.

There are several stages of planning for a timber harvest unit. The steps get progressively more specific and culminate with on-site inspections by resource specialists who make final adjustments in the site plans prior to any construction activities. The adjustments may require moving a harvest unit boundary to avoid a stream segment, reduce the likelihood of remaining timber blowing down, or reduce the effects on the visual resource. These final changes are recorded on the Unit Cards (Appendix A-1) that provide the specific requirements that must be followed to harvest that unit. Similar levels of planning for roads and other activities are also applied. Forest Service personnel also inspect the work of contractors to ensure compliance. Most of the mitigation measures to be used during the implementation phase and after the project are identified during the planning phases of a project. They may be modified as

Preparing Mats of Processed Pulp for Bailing, APC Pulp Plant



the project develops, however, due to varying field conditions, in order to best accomplish the intent of the standards and guidelines. Examples of mitigation measures are listed below. Specific application of the mitigation measures to individual units are listed on the Unit Cards in Appendix A-1. Discussion of the potential effectiveness of mitigation measures being proposed are also found with the Unit Cards.

Mitigation measures include:

Soils

1. Suspend logs during yarding to protect sensitive soils.
2. Insure that culverts are removed from temporary roads and water bars are installed to lessen soil erosion.
3. Limit cut and fill slopes to 4 feet or less on "blue clay" soils.
4. Do not allow side casting of spoil material on mid-slope roads with steep side slopes.

Timber Productivity

1. Certify natural regeneration of stands within three to five years following harvest.
2. Schedule all harvested stands for precommercial thinning between 12 and 20 years of age. This is becoming a normal practice if budgets are not constrained.

Wildlife

1. Apply "state of the art" second-growth management techniques for areas of harvested deer winter range. Current techniques may include thinning and "gap management". While such techniques have proven effective in other locations, they are new to South-east Alaska and it is still premature to judge their effectiveness.

2. Protect existing habitat for bald eagles by establishing and maintaining a minimum 100 meters radius habitat management zone around each eagle nest tree.
3. Maintain trees suitable for use by eagles for hunting, feeding, and perching.
4. For raptors other than eagles, protect any snag or tree containing an evident raptor nest. Prohibit management activities within 100 meters of any active raptor nest from May 1, to July 31, when nesting birds would be most likely to be disturbed.
5. Where feasible and consistent with safety standards, retain snags to preserve adequate snag-habitat. Following are guidelines used to prioritize which snags to retain:
 - Only designated snags will be left in cutting units.
 - Spike-top, high stumped, broken-topped, rotten, and other unmerchantable live or dead trees may be designated as snag-habitat.
 - Snags designated should be no less than 11 inches DBH and 15 feet in height.
6. Road Management Measures

In addition to the mitigation measures discussed above that are mostly routine practices, several road management measures were evaluated for mitigation of impacts on wildlife and subsistence users. The brown bear habitat capability model used in projecting the effects of harvest and associated road access upon the brown bear indicates that roads may cause the greatest effect on brown bear habitat capability because of the increased likelihood of man/bear encounters and increased hunting access. Increased road access is of concern to the local subsistence hunters because they must increasingly compete with other hunters, especially for deer. Subsistence hunting areas have traditionally been accessed by boat, and the presence of new roads creates competition for subsistence hunters and a disadvantage to those without vehicles.

The potential for mitigating the effects of existing or new roads in Analysis Area 6 was evaluated based upon a range of opportunities. Seasonal or year-long road closure, entry by permit only (for individual roads or the entire road system) by administrative methods such as gating or signing was evaluated only as fair for potential effectiveness because of the remoteness of the locations and the difficulty of reasonable enforcement. Physically making roads impassable or designing roads to physically deny public access was evaluated as good for potential effectiveness for wildlife mitigation, but could generate public concern for recreation access and access for subsistence users. State regulatory authority opportunities for establishing seasons, bag limits, access permits, and licensing were evaluated as good for potential effectiveness in responding to wildlife and subsistence concerns, but are outside the Forest Service authority.

Mitigating the effects of timber harvest and associated road development upon the wildlife habitat and subsistence users is best done through a cooperative effort between the Forest Service, the State of Alaska, and the Native Corporations. While Forest Service roads typically are low standard roads and not suitable to all forms of public travel, most could provide access for recreation, subsistence uses, or other uses. In addition to protecting wildlife habitat and subsistence users, road management decisions will consider the economic costs associated with maintaining long-term access, the future uses that might occur within an area, the potential for providing a diversity of recreation opportunities, and the potential effects on fish habitat.

Based on the evaluation of mitigation opportunities, several mitigation measures were determined to be feasible and effective to varying degrees. Described below are several measures that are common to all alternatives.

- A. A road closure program would be implemented to reduce the vulnerability of bears to illegal and legal harvest. The road closure program will be jointly developed/implemented

with ADF&G and all major parties affected. Road closures will reduce, but not eliminate vulnerability to bear harvest. The road closure program will consist of the following elements:

- A public education program on road closures to be developed with the ADF&G.
 - A road closure enforcement program to be developed with ADF&G. Dual enforcement authority will be a priority.
 - Most closures will be for local roads with dead-ends within cutting units. The main roads that service larger areas of land generally are not affected.
 - Closures will be implemented by placing physical barriers on the roads to eliminate travel by four-wheeled drive vehicles. Barriers will include gates, piles of rock or logging slash, or ditches.
 - Closed road segments will remain open to travel by hiking.
 - In areas where the roads are closed, bridge construction will utilize modular spans which can be removed and used in other locations following sale operations.
- B. Jointly with ADF&G, the Forest Service will develop an educational program for logging and road construction camp operators and their personnel to, 1) reduce DLP kills of brown bears, and 2) explain Forest Service/ADF&G bear management programs. This program will be presented annually by ADF&G to all camp operators and personnel.
- C. The Forest Service, as a part of the community of Hoonah, will work with the community and all parties affecting to resolve bear/garbage problems. In addition, garbage incinerators will be in place and functioning in all camps prior to their opening.

Fisheries/Watershed

Most fish habitat is included in Class I Aquatic Habitat Management Units (AHMUs). For Class I AHMUs, the specific standards and guidelines, including the measures employed to accomplish the standards and guidelines, are described below. Standards and guidelines for Class II and III AHMUs are generally less restrictive than those for Class I AHMUs. See the Aquatic Habitat Management Handbook (USDA Forest Service 1986a) for these standards and guidelines.

1. Maintain existing (natural) stream channel and bank conditions with specific reference to: stream width-to-depth ratio, pools and riffles(sequence, volume, and depth), undercut banks, stable debris, and other in-stream cover characteristics. To accomplish this, the following measures will be employed.
 - Directionally fall timber away from streamcourses (to include lining and jacking if necessary).
 - Split the yarding on the stream or fully suspend timber over the streamcourse.
 - Do not limb timber within or suspend over the streamcourse.
 - Remove all small, unattached debris less than 4 inches in diameter that is introduced into the streamcourse by human-related activity within 48 hours of its introduction.
 - Do not remove windthrow and inadvertently felled timber affecting the streamcourse unless it adversely impacts fish habitat, as determined by a fish biologist.
 - Leave standing all trees which affect streambank stability, including all deciduous and unmerchantable vegetation.
 - If significant areas of mineral soil are exposed, these areas will be grass seeded and fertilized within the first growing season.

2. Maintain average daily maximum summer temperatures below 58 degrees F. On streams with normal, daily summer maximum temperatures in excess of 58 degrees F, maintain average summer maximum temperature.
 - No timber harvest should occur that would reduce critical stream shading on streams known to have excessive temperatures.
 - Along streams with known potential temperature sensitivity, retain at least 75 percent of the shade producing vegetation next to the stream. Additionally, timber harvest should be limited to 660 linear feet per harvest unit along the southern, southwestern, southeastern, and western sides of streams. Harvest along other aspects should be limited to 1300 linear feet per unit.
 - All standing vegetation less than 12 inches diameter breast height (DBH) within the AHMU will be retained whenever possible.
3. Maintain the natural migration routes of adult and juvenile anadromous and high-quality resident sportfish.
 - Provide passage for adult pink and chum salmon in all cases.
 - Provide passage for all other species on all streams with natural stream gradients of 4 percent or less, using typical designs for bridges or culverts installed at a grade of 1 percent or less. For streams with gradients steeper than 4 percent, evaluate the potential trade-off between the loss of rearing fish production and the cost of providing rearing fish passage. The 4-6 percent gradient stream reaches are especially critical since standard culvert design cannot be implemented to provide fish passage. Fish passage on these gradients requires open-bottom structures, baffled culverts or other non-standard structures, which are much more costly than standard designs. See the Aquatic Habitat Management Handbook (USDA Forest Service 1986a) for an explanation of the trade-off evaluation method.
4. Maintain water quality for the propagation of fish, shellfish, and other aquatic life as defined by the State of Alaska, Water Quality Standards, (amended February 1979).
 - Culverts should be properly bedded to prevent undermining and eroding seepage, and should utilize energy pools or other dissipating techniques at the outfall.
 - Stream crossings should be located where switchbacks and bridge approaches would not create drainage problems.
 - Bridge abutments should be designed to minimize disturbance to streambanks.
 - Areas of exposed mineral soil should be revegetated during the first growing season following exposure.
 - Timber harvest settings that cross streams are undesirable. Where unavoidable, they should be located to permit practical yarding techniques that minimize adverse impacts. Techniques that have been found acceptable include, but are not limited to right angle crossings and full suspension yarding.
 - Minimize use of equipment in streams.
 - Natural filter strips should be left where necessary to filter the sediment carried by water flowing from disturbed areas such as roads, landings, and sort yards
5. Provide, in perpetuity, future sources of large organic debris (LOD) to aquatic habitats while maintaining and/or enhancing quantities of existing instream debris.
 - Retain trees that cannot be directionally felled away from stream or those that would result in serious impacts to the AHMU.

- Do not remove suspended LOD over the stream.
 - Retain an adequate number of trees for LOD, as determined by fisheries biologists, on both sides of the stream if both sides are proposed for harvest.
 - Coordinate future sources of LOD with second-growth management program.
 - Retain within 75 feet of the stream, 1) all deciduous trees, 2) all conifer trees less than 12" DBH, 3) all snags, 4) coniferous trees of all sizes with a 10% or greater lean over the stream, and 5) other large coniferous trees as needed for future sources of LOD.
 - Trees that are felled into or across streams should be left in place. Unattached small debris (less than 4" diameter) shall be hand removed within 48 hours.
 - Trees preferred for retention, based upon length of their expected useful life as LOD, are prioritized as follows: 1) cedar, 2) spruce, and 3) hemlock. A mix of species is preferred, however, and should be maintained whenever possible.
 - Maintain existing LOD by not salvaging windthrown trees suspended over the stream or on the streambanks unless specifically designed for fish habitat enhancement on a case-by-case basis.
 - Maintain existing LOD by not removing existing (natural) instream debris.
6. Increase primary and secondary biological production in streams without adversely affecting juvenile salmonid habitat.
- Mixed stands along streams with gradients between 0 and 6 percent, can normally be precommercially thinned to the streambank edge.
 - Alder immediately adjacent to the stream should be managed to provide 75 percent shade on the stream.
 - Priority for precommercial and commercial thinning should be given to stands adjacent to streams that could benefit from such activity.
 - All streamside vegetation along streams with gradients between 0 and 6 percent should be managed to keep daily maximum water temperatures below 58 F. while opening the stream to sunlight.
 - Complete canopy removal treatments should only be used along stream sections with abundant instream cover or along streams which are not temperature sensitive (see guidelines for temperaturesensitivity in AHMU Handbook (USDA Forest Service 1986a)).

Visual Resources

1. Create irregular unit boundaries on visually sensitive units.
2. Design rockpits to eliminate visibility to saltwater travelers.
3. For areas of Partial Retention Visual Quality Objective (VQO): Design activities to be subordinate to the landscape character of the area within one year of project completion. The following measures will be employed to accomplish this:
 - In designing facilities, emphasize enhancement of views both to and from the facility and use colors found in the natural environment, considering seasonal variations.
 - Design quarries and rock sources in locations not visible from sensitive travel routes. Rehabilitation plans will be developed for implementation following closure of rock source developments.
 - Rehabilitation plans will be developed for implementation at the close of temporary LTFs.

4 Environmental Consequences

- A landscape architect on the Forest should be involved in all stages of permanent LTF planning and design. Low profile designs should be considered to minimize visibility from adjacent travel routes.
4. For areas of Modification VQO activities may visually dominate the original characteristic landscape, however, the following measures will be employed to achieve minimal landscape modification where possible.
 - Utilize naturally occurring form, line, color, and texture found in the natural landscape when planning activities.
 - Design of transportation and harvest facilities should borrow from naturally occurring patterns in the landscape, and should not be visually dominate when viewed as background. Siting of facilities should also consider this standard.
 5. For areas of Maximum Modification VQO, the landscape may be dominated by management activities. Nevertheless, activities should be designed to resemble natural occurring features when viewed as background.

Cultural Resources

1. Avoid known cultural sites. This is coordinated with the State Historical Preservation Officer and has been effective for preserving known sites.
2. A cultural resource specialist on the Forest will survey those sites proposed for harvest that have not been previously surveyed for archeological resources prior to harvest.

Chapter 5

List of Preparers

Chapter 5

List of Preparers

US Forest Service

Theodore Allio, Transportation Planner

Certificate, Transportation Analysis, Oregon State University
Certificate, Logging System Analysis, Oregon State University

Forest Service: 20 years
Transportation Planner, Tongass National Forest (12 years)

Gordon Anderson, Chatham Area Timber Planner

B.S., Forestry Management, Utah State University, 1971
Forest Service: 25 years
Assistant Interdisciplinary Team Leader, Forest Plan, Siskiyou National Forest
Timber Management Assistant, Ochoco National Forest (5 years)
Working on five National Forests and two separate regions

Robin Bergey, Cartographic Support

B.A., Anthropology and Earth Science, University of Northern Colorado, 1978
Forest Service: 7 years
Cartographic Technician, Tongass National Forest, Chatham Area (1 year)
Engineering Draftsman, Tongass National Forest, Chatham Area (2 years)
Personnel Clerk, Tongass National Forest, Chatham Area (2 years)
Archeology Technician, Tongass National Forest, Chatham Area (2 years)

Other Employment:

Denver Museum of Natural History
University of Colorado Museum
Owner, Kasnyku Studies (photography, drafting, graphics) (6 years)

Norene Blair, Writer/Editor/Forester

B.A., Planning and Administration, University of Oregon, 1968
M.A., Planning and Administration, University of Oregon, 1970
M.S., Forest Management (Silviculture), University of Idaho, 1977
Pre-doctoral Studies, Forest Entomology, University of Idaho

Forest Service: 12 years
Land Use Coordination, Columbia River Gorge National Scenic Area
Writer/Editor/Indexer - Detailer - Ochoco, Siskiyou, and Malheur National Forests (2 years)
Forester, Sale Planner/Logging Systems Specialist, Burns Ranger District
Malheur National Forest (2 years)
Environmental Coordinator, Burns Ranger District (3 years)
Forester/Data Base Specialist, Planning Team, Malheur National Forest (4 years)

Other Employment:

Instructional Assistant, Resource Economics, University of Idaho (3 years)

Helen Clough

B.A., Anthropology, 1973

Forest Service: 8 years

Public Affairs, Tongass National Forest, Chatham Area (2 years)

Line Management, Tongass National Forest (4 years)

Land Management Planning, Tongass National Forest (2 years)

Other Employment:

Natural Resources Management (2 years)

Archaeology (6 years)

Jon Cummins, Computers/Engineering

B.S., Mathematics, Northern Arizona University, 1973

Civil Engineering, Northern Arizona University, 1978

Forest Service: 15 years

Civil Engineer, Tongass National Forest, Regional Office (6 months)

Civil Engineer, Tongass National Forest, Ketchikan Area (7 years)

Civil Engineer, Coconino National Forest, Flagstaff, Arizona (7.5 years)

Stanley D. Davis, Forest Archeologist

B.A., Anthropology, University of Northern Colorado

M.S., Social Science/Archeology, University of Northern Colorado

Forest Service: 11 years

Forest Archeologist, Tongass National Forest, Chatham Area

Other Employment:

Instructor - University of Alaska, Juneau (1 year)

Instructor - Islands Community College, Sitka, Alaska (2 years)

Assistant State Archeologist, Utah (1 year), Independent Contractor - Archeology (2 years)

Assistant Director, Sonora Archeological Program (2 years)

Teaching Assistant, Anthropology Department, University of Northern Colorado (1 year)

Ronald M. Dippold, Forester

B.S., S.U.N.Y. College of Forestry, 1958

Graduate Work in Statistics and Forest Administration, 1966-1967

Graduate Work in Public Administration

Forest Service: 25 years

Timber Management, Inventory, Plans, Silviculture, Budget, and Appeals, Regional Office, Alaska Region (12 years)

Forester, Forest Inventory and Research, Pacific Northwest Forest and Ranger Experiment Station, Juneau, Alaska (12 years)

District Assistant for Range, Wildlife, and Lands, Ochoco National Forest

Range Survey and Mapping, Timber Sale Administration, and Mining Claims, Ochoco National Forest

Silviculture and Fire Control, Ochoco National Forest

Ted Falkner, Civil Engineering Technician

Civil Engineering, Humboldt State University, 1959

Forest Service: 30 years

GIS Coordinator (2 years)

Planner (5 years)

Engineering (23 years)

William F. Fieber, Logging Systems and Transportation Systems

B.S., Forest Management, University of Minnesota, 1973

M.F., Forest Engineering, Oregon State University, 1976

Forest Service: 25 years

Transportation Planner, Tongass National Forest, Chatham Area (1 year)

Regional Logging Engineer, Timber Management, Region 5 (8 years)

Forest Logging Engineer, Olympic National Forest (3 years)

Advanced Logging Systems Program, Oregon State University (2 years)

Management Plans Forester, Mendocino National Forest (4 years)

TMA Plans, McCloud Ranger District, Shasta-Trinity National Forest (3 years)

Pre-Sale Forester, Olympic National Forest (4 years)

Other Employment:

Lecturer, School of Forestry, University of Canterbury, New Zealand (1 year)

Susan Gorder, Civil Engineering Technician

A.A., Civil Engineering Technology, American River College, 1982

Forest Service: 3 years

GIS Staff, Tongass National Forest, Chatham Area (1 year)

Engineering, Tongass National Forest, Juneau Ranger District (1 year)

Robert H. Huecker, Soil Scientist

B.S., Resource Management, University of Wisconsin-Stevens Point, 1976

Forest Service: 11 1/2 years

Soil Scientist, Chucagh National Forest (5 1/2 years)

District Soil Scientist, Thorne Bay Ranger District, Tongass National Forest (3 1/2 years)

Soil Scientist, Tongass National Forest, Chatham Area (2 1/2 years)

Other Employment:

Soil Conservationist, Dunn County Soil and Water Conservation District, Menomonie, Wisconsin (15 months)

Charles Kosak, Transportation Planner

Forest Service: 19 years

Survey and Road Design, Shasta Trinity National Forest (6 years)

Transportation Planner, Idaho Panhandle National Forest (1 year)

Transportation and Logging Systems Planning, Shasta Trinity National Forest (11 years)

Transportation Planning, Tongass National Forest (1 year)

Lyle Krueger, Cartographic Technician and Consultant

Forest Service: 14 years

Geometronics, Cartographic Technician and Special Maps, Regional Office, Alaska Region (8 years)

Cartographic Technician and Primary Base Geometronics, Service Center (4 years)

Cartographic Technician and Primary Base Geometronics, Regional Office, Region 9 (4 years)

Engineering Technician, Regional Office, Region 9 (2 years)

Annemarie Lafaline, Forester Interdisciplinary Team Member

B.S., Oregon State University, 1980

Forest Service: 8 years

Presale - Sitka Ranger District, Chatham Area (8 years)

Timber Sale Planner - Mt. Hood National Forest

Marilynne E. Lawson, Cartographic Technician

Forest Service: 13 years

Cartographic Technician, Regional Office, Alaska Region (8 years)

Cartographic Aid/Technician, Region 6 (5 years)

Other Employment:

Cartographic Technician, U.S. Bureau of Mines (5 years)

Nels H. Lawson, Database Management

Electronics, Foothill College, 1976

Engineer in Training, 1977

Forest Service: 9 years

Engineering Budget/Engineering Computer Specialist, Tongass National Forest, Chatham Area (8 1/2 years)

Transportation Planner, Tongass National Forest, Chatham Area (6 months)

Gary Lehnhausen Wildlife Biologist Interdisciplinary Team Member

B.S., Utah State University, 1972

Forest Service: 18 years

Wildlife Biologist - Tongass National Forest, Chatham Area

Zone Wildlife Biologist - Sierra National Forest

R. Michael Martin, Economist

B.A., Economics, University of California, Santa Barbara, 1973

M.S., Economics, University of Oregon, 1979

Ph.D., Economics, University of Oregon, 1981

Other Employment:

Finance and Administration Officer, United Nations, Rome, Italy (3 years)

Economist, Bureau of Land Management (6 years)

Private Consultant (4 years)

Local Government Planner, Roseburg, Oregon (1 year)

Domenick J. Monaco, Landscape Architect

B.S., Landscape Architecture, Pennsylvania State University, 1972

Forest Service: 8 years

Landscape Architect, Tongass National Forest, Chatham Area

Other Employment:

Landscape Architect, U.S. Army Corps of Engineers (2 years)

Landscape Architect, GWSM, Inc. (7 years)

Philip W. Mooney, Wildlife Biologist

B.S., Wildlife Management, Utah State University, 1972

Forest Service: 19 years

Forestry Technician, Bridger National Forest (9 years)

Wildlife Biologist, Dixie and Fishlake National Forest (3 years)

Interdisciplinary Wildlife Biologist, Bridger-Teton National Forest (6 years)

Wildlife Biologist, Okanogan National Forest

Vegetation Management and Nursery Management EIS Team member, Region 6 (1 year)

Other Employment:

Environmental Consultant, Boise, Idaho (2 years)

John B. Morrell, Lands Forester

B.S., University of Montana, 1967

M.S., Forestry, California State University, Humboldt, 1976

Master of Forest Resources, Outdoor Recreation Emphasis, University of Washington

Forest Service: 15 years

Lands Forester, Tongass National Forest, Chatham Area (4 years)

Resource Assistant, Thorne Bay Ranger District, Tongass National Forest, Ketchikan Area (2 years)

Resource Assistant, North Prince of Wales Ranger District, Tongass National Forest, Ketchikan Area (1.5 years)

Forester/Recreation Assistant, Packwood Ranger District (3.5 years)

Research Assistant, Pacific Northwest Forest and Range Experiment Station, Seattle

Mary Beth Nelson, Recreation Planner

B.S., Recreation Area Management, Montana State University, 1979

Forest Service: 8 years

Recreation Planner, Tongass National Forest, Chatham Area, (4 months)

Architectural Technician, Chatham Area, Tongass National Forest (5 years)

Architectural Technician, Kootenai National Forest (2.5 years)

Dave Niemann, Cartography Section Supervisor

B.S., Wildlife Management, Utah State University

B.S., Biological Sciences, Utah State University

Masters Biological Sciences Education, Utah State University

Forest Service: 10 years

Geometronics Cartography Section Supervisor, Regional Office, Alaska Region

Other Employment:

Digital Land Mass Simulation - Production Section Supervisor, Imagery Analysis Techniques Office

Defense Mapping Agency, Aerospace Center, St. Louis, Missouri

Henry W. Newhouse, Fisheries/Wildlife/Subsistence/Mitigation

B.S., Fisheries Biology, Humboldt State University, 1972

Fisheries Biology, Graduate Studies, Humboldt State University

Forest Service: 14 years

Fisheries Biologist, Wildlife and Fisheries Staff, Regional Office, Alaska Region (7 years)

Forest Fisheries Biologist, Nezperce National Forest (3.5 years)

Forest Fisheries Biologist, Kootenai National Forest (2 years)

District Wildlife/Fisheries Biologist, Warner Mountain Ranger District, Modoc National Forest (1.5 years)

Other Employment:

Graduate Fellowship, California Cooperative Fisheries Unit, Humboldt State University, 2 years

Steve Paustin, Hydrologist, Interdisciplinary Team Member

B.S., Colorado State University

M.S., Forest Hydrology, Oregon State University

Forest Service: 11 years

Research Assistant, Oregon State University

Forest Hydrologist, Chatham Area

Kathy Peterson, GIS Support

B.A., History, Washington State University, 1971

Forest Service: 10 years

Civil Engineering Technician (Transportation Planning), Tongass National Forest, Chatham Area (1 year)

Civil Engineering Technician (Road Design and Construction Inspection) Okanogan National Forest (8 years)

James Pierce, SEIS Team Leader

B.S., Forest Engineering, Oregon State University, 1966

Forest Service: 17 years

District Ranger, Willamette National Forest and Mt. Hood National Forest (5 years)

Group Leader for Planning, Regional Office, Alaska Region (3 years)

Planning Staff, Ochoco and Umpqua National Forests (3 years)

Logging Engineer, Ochoco National Forest (1 year)

Misc. Forester Positions on Willamette and Mt. Hood National Forests (5 years)

Other Employment:

Consulting Forest Engineer (1 year)

General Manager, Sawmill (2 years)

Dennis J. Rogers, Environmental Coordinator

B.S., Geology, Kent State University, 1968

M.S., Geology, Kent State University, 1974

Forest Service: 13 years

Willamette National Forest (2 years)

Siuslaw National Forest (2 years)

Tongass National Forest (2 years)

Miller T. Ross, Timber Staff Officer, Chatham Area

B.S., Forestry, Michigan State University, 1961

B.S., Education, Chadron State College, Nebraska, 1972

Forest Service: 23 years

Timber Staff Officer, Tongass National Forest, Chatham Area

Timber Staff Officer, Routt National Forest (7 years)

Forester, Region 2, Medicine Bow, Rio Grande, Bighorn, and Routt National Forests

Other Employment:

Public School Teacher 1970-1972 in Bushnell, Nebraska School System

James Russell, Silviculturist

B.S., Forestry, University of Minnesota, 1970

Forest Service: 7 years

Forester/Silviculturist, Tongass National Forest, Chatham Area (3 years)

Forester, Regional Office, Milwaukee, Wisconsin (2 years)

Forester, Chippewa National Forest, Cass Lake, Minnesota (7 years)

Forester, Tongass National Forest, Petersburg, Alaska (6 years)

John C. Sherrod, Process Review and Oversight

B.A., Forestry, University of Georgia, 1960

M.S., Forest Resources, University of Idaho, 1980

Forest Service: 27 years

Experience on seven National Forests in three Forest Service Regions. Positions include Planning Staff Officer (three Forests), Planning Team Leader (three Forests), District Ranger, and District Staff (four Ranger Districts).

Glen Stein, Chatham Area IDT Timber Planner

B.A., Forestry, Humboldt State University, 1978

Forest Service: 10 years

Forester, Tongass National Forest, Chatham Area (4.5 years)

Forester, Tonto National Forest (2.5 years)

Forester, Santa Fe National Forest (1.5 years)

Karen Swanson-Iwamoto,

B.A., Anthropology, Oregon State University, 1979

B.A., History, Oregon State University, 1979

Forest Service: 7 years

Archaeologist, Chatham Area (6 years)

Gary Van Hine,

A.S., Forestry, Sheldon Jackson College, Sitka, Alaska

Forest Service: 12 years

Civil Engineering Technician, Tongass National Forest, Chatham Area (11 years)

Forestry Technician, Tongass National Forest, Chatham Area (1 year)

Kenneth D. Vaughan, Engineering Transportation Planner

B.S., Civil Engineering

M.S., Civil Engineering with Industrial Engineering Minor

Predoctoral Studies: Civil and Industrial Engineering

Forest Service: 17 years

Other Employment:

Part-time Instructor, University of Alaska (7 years)

John Warner, Logging Engineer

B.S., Forestry, Oregon State University, 1955

Logging Engineering Program, Pacific Northwest Forest and Range Experiment Station

Forest Service: 29 years

Regional Logging Engineer, Regional Office, Alaska Region

Logging Engineering Staff, Regional Office, Pacific Northwest Region

Assistant Timber Staff, Six Rivers National Forest, California Region

Engineering Technician (GS-11) California Region

Richard R. Zaborske, Forester

B.S., Forest Management, University of Wisconsin-Stevens Point, 1977

U.S.D.A. Forest Service Certification, Silviculture, 1985

Professional Certification, Soil Science, 1986

M.F. Forest Engineering, Oregon State University, 1989

Forest Service: 12 years

Interdisciplinary Team Forester, Tongass National Forest, Chatham Area (6 months)

Zone Silviculturist, Lincoln National Forest (5 years)

Soil Scientist, Prescott National Forest (3 years)

Elsan Zimmerly, Photographic Coordinator, Writer/Editor

B.S., Forestry Recreation, Colorado State University, 1984

Country School of Photography, Vermont

Forest Service: 4 years

Writer/Photographer, Regional Office, Alaska Region (2 years)

Naturalist, Alaska Region (2 years)

Photographic Coordinator; Begich, Boggs Visitor Center, Portage, Alaska

Other Employment:

Instructor of Photography, Experimental Learning Program, Colorado State University
(6 years)

Writer/Photographer; Poudre Magazine, Triangle Review, Choice Magazine, Fort Collins,
Colorado.

Freelance Writer/Photographer (15 years)

Dames & Moore

Janine C. Blaeloch, Technical Writer/Editor/Environmental Planner

Landscape Architecture, University of Washington

B.A., Environmental Studies, University of Washington, 1989

Dames & Moore: <1 year

Environmental Analysis

Technical Writing

A. David Every, Project Team Leader/Senior Terrestrial Ecologist

B.S., Zoology, University of Utah, 1967

M.S., Botany, University of Utah, 1969

Ph.D., Botany, University of Washington, 1977

Dames & Moore: 1 year

Project Manager

Environmental Impact Assessments

Habitat Evaluation Procedure

Wetlands/Terrestrial Ecology

Other Employment:

Envirosphere Company, Terrestrial Ecologist (5 years)

NUS Corporation, Terrestrial Ecologist (3 years)

Principal Investigator in various consulting capacities (1 year)

Deborah J. Flynn, Technical Writer/Editor/Coordinator/Environmental Planner

B.S., Natural Resource and Recreation Planning and Forestry, Oregon State University, 1984

M.S., Natural Resource Economics, University of Arizona, 1986

Dames & Moore: 2 years

Natural Resource Economics

Technical Writing

Public Relations

Other Employment:

U.S. Forest Service (3 years)

Phillip J. Leapley, Technical Writer/Coordinator/Terrestrial Ecologist

B.S., Biology, Washington State University, 1977

M.S., Environmental Science, Western Washington University, 1980

Dames & Moore: 1 year

Habitat Evaluation

Mitigation Planning

Environmental Impact Statements

Permit Applications

Property Transfer Site Assessments

Other Employment:

Hosey and Associates, Project Ecologist (2 years)

RW Beck and Associates, Project Ecologist (2 years)

Washington State Department of Transportation, Environmental Planner (1 year)

GPA Consulting Services, Biological Consultant (3 years)

Douglas J. Martin, Technical Writer/Senior Biologist

B.S., Water Resource Management and Pollution Ecology, University of Washington, 1971
M.S., Fisheries Biology and Aquatic Ecology, University of Washington, 1976
Ph.D., Fisheries Science and Salmonid Ecology, University of Washington, 1985

Dames & Moore: 2 years

Environmental Impact Assessments

Managing and Conducting Baseline Studies

Project Manager--Salmonid Ecology and Fisheries Biology, Fish Habitat Restoration and Enhancement

Other Employment:

Envirosphere Company, Senior Scientist (4 years)

Independent Consultant (7 years)

University of Washington Fisheries Research Institute, Fisheries Biologist (7 years)

Robin Scheid, Technical Writer/Coordinator/Editor/Marine Biologist

B.S., Marine Biology, Davidson College, 1986

Dames & Moore: 1 year

Technical Writing

Marine Biology Field Technician

Oceanography Field Technician

Other Employment:

National Marine Fisheries Service, Fisheries Biologist (2 years)

Schooner, Inc., Marine Biologist (1 year)

Kathryn J. Stenberg, Technical Writer/Editor/Coordinator/Wildlife Ecologist

B.A., Biology - Environmental Studies, Whitman College, 1980

M.Admin., Environmental Administration, University of California, Riverside, 1982

Ph.D., Wildlife and Fisheries Sciences, University of Arizona, 1988

Dames & Moore: <1 year

Environmental Impact Assessments

Habitat Evaluation

Technical Writing

Other Employment:

University of Arizona, Research Associate (5 years)

King County Building and Land Development Division, Utilities Planner (1 year)

University of California, Riverside, Research Associate (2 years)

Gail Thompson, Technical Writer/Coordinator/Editor/Senior Environmental Scientist

B.A., Anthropology, University of Washington, 1969

M.A., Anthropology, University of Washington, 1971

Ph.D., Anthropology, University of Washington, 1978

Dames & Moore: 3 years

Managing and Conducting Hazardous Waste Assessments

Senior Project Manager

Senior Archeologist

Senior Environmental Analyst

Senior Anthropologist

Other Employment:

Hart Crowser, Inc., Cultural Resources Specialist (2 years)

The Earth Technology Corporation, Manager of Cultural Resources Services (6 years)

Shannon and Wilson, Inc., Staff Archeologist (1 year)

University of Victoria, Visiting Lecturer (1 year)

Wilke-Thompson, Partner (4 years)

University of Delaware, Anthropology Instructor (1 year)

Photo Contributors

Alaska Pulp Corporation

Alaska Department of Fish & Game

Alaska State Library

Jan Albayalde

George Figdor

Elaine Loopstra

Steve Paustin

Elsan Zimmerly

Chapter 6

**List of Agencies,
Organizations, and
Persons to Whom
Copies of this
Statement Were Sent**

Chapter 6

List of Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

Name	Organization
Don Cornelius	Alaska Dept. of Fish & Game
Jack Gustafson	Alaska Dept. of Fish and Game
R.Larson & J.Edgington	ADF&G, Commercial Fisheries
Don Ingledue	ADF&G, Commercial Fisheries
Gregory Thomason	ADF&G, Commercial Fisheries
Robert Schroeder	ADF&G, Subsistence Division
R.Bosworth & B.Schroeder	ADF&G, Subsistence Division
Don Cornelius	ADF&G, Habitat Division
Dave Hardy	ADF&G, Habitat Division
R.Reed & L.Shea	ADF&G, Habitat Division
Jeffrey Hughes	ADF&G, Nongame
S.Elliott & M.Schwann	ADF&G, Sport Fisheries Division
F.Gaffney & M.Bethers	ADF&G, Sport Fisheries Division
Artwin Schmidt	ADF&G, Sport Fisheries Division
	ADF&G, Game Division
E.L. Young	ADF&G, Wildlife Conservation Division
D.Anderson & M.Kirchoff	ADF&G, Wildlife Conservation Division
David James	ADF&G, Wildlife Conservation Division
Rod Flynn	ADF&G, FRED Division
	Agr. Stabilization & Cons.
Dick Tsuru	AK PAC, Trading Co.

Name	Organization
	Alaska Legal Services Corp.
Vance Sanders	Alaska Legal Services Corp.
Walter Pasternak	Alaska Troller's Association
	Alaska Native Brotherhood
	Alaska Miners Association
	Alaska Pulp Corporation
Frank Ropell	Alaska Pulp Corporation
	Alaska House Resource Committee
	Alaska Senate Resource Committee
	Alaska Federation of Natives
E. O. Bracken	Alaska Miner's Association
Richard Myren	Alaska Biological
Dave Sturdevant	Alaska Dept. Of Environmental Conservation
Jonathan W. Scribner	Alaska Dept. of Transportation/Public Facilities
Documents Librarian	Alaska State Library
Earl Krygier	Alaska Trollers Association
Rep. Kayn Wallis	Alaska State Legislature
Sally Coady	Alaska Women in Timber
Gregory Head	Alaska Timber Corporation
Diane Mayer	State of Alaska/OMB-DGC
Art Kennedy	ALUC, Land Use Advisory Comm.
Craig Lindh	ALUC, Staff,Comm. Part./OMB-DGC
Office of the Fed Cochairman	ALUC
Wayne Ross, Esq.	ALUC, Land Use Comm., Dec
Ron McCoy	ALUC, Staff AK Land Use Council
	Anchorage Municipal Libraries
Jim Labau	Anchorage Forestry Science Lab
Alaska Collection	Anchorage Municipal Libraries
	City of Angoon
Dave Rose	Angoon High School
K.J. Metcalf	Angoon Trading Company
	Angoon Community Association
	Angoon Public School
George Jim, Sr.	Angoon Advisory Committee
Lee L. Antrim	Antrim Associates

Name	Organization
Richard Ogar	Arco Alaska, Inc.
Dr. George Snyder	Auke Bay Lab.
Tom L. Pittman	Bureau of Mines
	Bureau of Land Management
Avrum Gross	Chatham Cannery Partnership
	Chec - Forest Watch
Warren Pellett	Chevron Marina
Larry Beck	Chilkoot Lumber Co.
Phil R. Holdsworth	Citizen's Advisory Commission
Sen. Bettye Fahrenkamp	Citizen's Advisory Committee
	Commissioner Dept. Nat. Resources
	Cooke Cablevision
Mary Lucile Born	Craig Public Library
Jeannette Konoske	Credit Bureau of Sitka, Inc.
	Dames & Moore
J. Sonnenfeld	Department of Geography
Douglas Public Library	c/o Juneau Memorial Library
	Div. of Land & Water Management
Jim Mc Allister	Div. Of Forestry
Peggy Simons	Division of Public Services
Dr. Helen Mc Cammon	Ecological Research Division
Bob Maurant	Elfin Cove Advisory Committee
	Elfin Cove Advisory Committee
Greg Howe	Elfin Cove Advisory Committee
Patrick Ahtey	ENSR
	Environmental Protection Agency
	Esther Greenwald Public Library
	Fairbanks Public Library
Clare Doig	Foresters and Managers, Inc.
Russel Bartoo	Gastineau Channel Advisory Committee
Nick Yurko	Gastineau Channel Advisory Committee
	General Services Administration

Name	Organization
Marvin O. Jensen	Glacier Bay National Park
J. & M. Rosenbruch	Glacier Guides
	Haines Borough Public Library
Robert L. Hames	Hames Corporation
Robert C. Prefontaine	High Drive Drilling
	City of Hoonah
Liv C. Gray, Mayor	City of Hoonah
Al Hill	Hoonah Advisory Committee
Gordon Pederson	Hoonah Advisory Committee
Wanda Culp	Hoonah Indian Association
	Huna-Totem Corporation
	Hydaburg School District
	Irene Ingle Public Library
	Irene Ingle Public Library
	Island News
	Juneau Chamber of Commerce
	Juneau Memorial Library
M.J. Bishop	Kaiser Cement Corp./Mineral Res
	Kake Tribal Corporation
	Kake City Office
	Kake City Community/School Lib.
Ken Mears	Katnai Sportfishing Guides
Steve Connelly	Ketchikan Pulp Co., Thorne Bay
	Ketchikan Daily News
	Ketchikan Public Library
	Kettleson Memorial Library
Jo Ann Ross	KHNS Radio
Don Fleeman	KIFW-Radio
	Klawock Heenya Corporation
Robert Loiselle	Klukwan Forest Products, Inc.
Walter A. Soboloff	Kootznoowoo Corporation
Ethel Bergman	City of Kupreanof
Rhonda Lichtwake	KSTK-FM

Name	Organization
	Marine Mammal Commission
Carl A. Newport	Mason, Bruce & Girard, Inc
	Mendenhall Valley Public Library
Don Brown	Mud Bay Logging Company
Steve Pennoyer	National Marine Fisheries Service
DR. K. Koski	NMFS, Auke Bay Lab
Sonia Naubaver	News Director, KFSK
	Office of Environment Review
	City of Pelican
	Pelican Public Library
	Pelican Public Library
	City of Petersburg
	Petersburg Public Library
Sig Mathisen	Petersburg Vessel Owners Assoc. Clyde Curry
	Petersburg Advisory Committee
	Petersburg Pilot
Bob Tkacz	Petersburg Pilot
	City of Port Alexander
	City of Port Alexander
William E. Odell	Planning Commission
Becky Gay	Resource Development Council
James Clark	Robertson, Monagle, Eastaugh & Bradley
Greg Minor	Saltman and Stevens
John Fausti	Saltman and Stevens
Linda Kruger	SE Region, Alaska State Parks/DNR
Mike McKinnon	SE Region, Tech. Services
Robert Himman	SE Regional Council
	SEACC
Robert W. Loescher	Sealaska Corporation
Michael K. Snowden	Service Transfer, Inc.
Glen Charles	Shaan-Seet, Inc.
James Senna	Shee Atika, Inc.
Dr. Ron Dick	Sheldon Jackson College

Name	Organization
	Alaska Chapter, Sierra Club
Edgar Wayburn	Sierra Club
Mark Cooper	Siskiyou NF
Mark Cooper	Siskiyou NF
Molene Capbell	City and Borough of Sitka
T. Smith	Sitka Advisory Committee
	Sitka Chamber of Commerce
Virgil Henke	Sitka Advisory Committee
	Skagway Public Library
Bruce Johnson	Society of American Foresters
Environmental Coordinator	Soil Conservation Service
Don Soukup	Soukup Wire Rope
Kate Troll	Southeast Seiners Assoc.
	Southeastern Log
Adele Backeil	Spec CRS-ENR, LM-423
	State-Fed. Coord./Project Alaska
	Stratton Library
Joseph Sebastian	Sumner Strait Advisory Comm.
Warren F. Powers	Sumner Strait Advisory Comm.
L.L. Schroeder	Supt. Hydaburg School
	City of Tenakee Springs
	Tenakee Springs Public Library
Don See	Tenakee Advisory Committee
	Thorne Bay Community Library
	Timber Faller, Inc
	Tlingit-Haida Central Council
Geron Bruce	U.S.A.G.
Steve Colt	University of Alaska, Anchorage Director. Envir
	US Dept. of Interior
	US Fish & Wildlife Service
Marcus Horton	US Fish & Wildlife Service
Michael Jacobson	US Fish & Wildlife Service
Wayne Oien	US Fish & Wildlife Service
	US Army Corps of Engineers

Name	Organization
Comm. Douglas Smith	US Coast Guard District 17
Representative Young	US House of Representatives
F. Dale Robertson, Chief	USDA, Forest Service, Washington, D.C.
Larry Ethelbath	USDI-BIA, Forestry/S.E. Agency
Dick Powers	Whalers Cove Lodge
Karen Jeffman	The Wilderness Society
John Schoen	The Wildlife Society
	City of Wrangell
James E. Gove	City of Wrangell
	Wrangell Sentinel
Rush Duncan	Wrangell Forest Products
Michael Lockabey	Wrangell Advisory Committee
Ronald M. Gelbrich	Wrangell Forest Products
	Yak-Tat Kwann, Inc.
Cheryl Esferwood	City of Yakutat Annette Anderson
Sandra L. Anderson	
Bruce Bachen	
Richard Baker	
Astrid Bethers	
Bruce Blake	
Arthur Bloom	
Floyd Branson	
Steve Brenner	
Royal Breseman	
Phil Briggs	
Gerald Brookman	
Jose Broto	
Mr. Everett Burns	
Edward Buyarski	
Richard Campbell	
Christopher Carroll	
Mona Christian	
Marlene Clarke	
Helen Clough	

Name	Organization
Dr. Henry Cole	
Gregory Cook	
Paul & Gail Corbin	
Chas. Dense	
Jim Digennaro	
David Duffey	
Helen M. Drury	
Thomas M. Franklin	
Barry Freedman	
Dr. Donald Freedman	
Peter Froehlich	
Wayne & Krist. Funk	
Joe Geldhof	
Virgil & Jean Gile	
Norma Goodman	
Richard Gordon	
Richard Hacker	
Kenneth Hammons	
Dave Hardy	
E.J. Haugen	
Jake Hess	
Amy & Charlie Hodgson	
Donn Hopkins	
Bob Howe	
Thomas E. Jacobsen, DDS	
Richard Jandreau	
Sid Jenson	
Gail Johansen	
Nora Ann Johnson	
Dorothy A. Jones	
Lois Jund	
Sally Kabisch	
Molly Kemp	
Chris Kent	
Robert Ketchum	

Name	Organization
Mark J. Kirchhoff	
K. & M. Leccese	
Max M. Lewis	
Cliff Lobaugh	
Enid & Fred Magill	
Craig Mapes	
Karin McCullough	
Mark Meeks	
Honorable Frank Murkowski	
Michael Nelson	
Richard K. Nelson	
Gloria Ohmer	
Edward Oetken	
Gloria Ohmer	
Sig Olson	
Wayne Pattison	
Tom Paul	
Jacob W. Pratt, Jr.	
G. H. Reifenstein Jr	
Carl Reller	
Steve Rentenstihl	
Chuck Rice	
N.J. Richards	
Irene Roundtree	
Gail Sage	
Edward Sargent,MD	
Lee Schmidt	
John Schulz	
Carolyn Servid	
John Shelton	
Jeff Sloss	
Robert Smith	
Lin Sonnenberg	
Richard Sprague	
Honorable Ted Stevens	

Name	Organization
Bob Stredwick	
John Swanson	
Honorable Robin Taylor	
D. Thorington	
Richard Uberuaga	
Dave Waarvik	
Janet Wallin	
David E. Wallingruff	
Bella Watson	
S. M. Watson	
Susan Watson	
Hans F. Weinberg	
Ralph Wells	
Ron Welsh	
Bill Whitman	
William Williamson	
Syd Wright	
Henry Wojtusik	
Rollin Young	
Ron Zobel	

Chapter 7

Literature Cited

Chapter 7

Literature Cited

- Alaback, P.B. 1984. Plant succession following logging in the Sitka spruce - western hemlock forests of Southeast Alaska. USDA, Forest Service, General Technical Report, PNW-173. 26pp.
- Alaska Department of Fish and Game. 1978. Petition to remove the brown bear *Ursus arctos* L. in Alaska from Appendix II to the Convention on International Trade and Endangered Species of Wild Fauna and Flora. On file, Alaska Department of Fish and Game, Juneau, AK. 71 p.
- _____. 1989. Southeast Alaska rural community resource use profiles. Report to the Board of Fisheries, February 1989, Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK.
- Alaska Department of Transportation and Public Facilities. 1976. Southeast Alaska Transportation Plan. State of Alaska, Department of Transportation and Public Facilities, Southeast Region.
- Alaska National Interest Lands Conservation Act. December 2, 1980. Public Law 96-487, 94 Stat. 2371.
- Alaska Native Claims Settlement Act. December 18, 1971. Public Law 92-203, 85 Stat. 688; US Code 1982 Title 43, Sections 1601 *et seq.*
- Alliway, N. 1988. Bureau of Land Management, Anchorage, AK. Personal Communication.
- Allotment Act. June 28, 1906. C. 3572; 34 Stat. 539, US Code 1982 Title 25, Sections 331 *et seq.*
- American Indian Religious Freedom Act. August 11, 1978. Public Law 95-341, 92 Stat. 469; US Code 1982 Title 42, Section 1996.
- Autrey, J.T. 1984. Supplement to Cultural Resource Overview for ALP 1986-90 Operating Period EIS, Alternative VCUs, MS. on file at Tongass National Forest, Chatham Area, Sitka, AK.
- Barton, M.A. 1987. Notice of Intent to produce a Supplement to the 1981-86 and the 1986-90 Operating Plan Environmental Impact Statements for the Alaska Pulp Corporation (formerly Alaska Lumber and Pulp Company). September 30, 1987.
- Beak Consultants, Inc. 1989. Fisheries surveys of fifty-one stream sites in logged or unlogged drainages on Prince of Wales Island, Alaska: Initial site survey report, September 1989.
- Bosch, J.M. and J.D. Hewlett. 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. *Journal of Hydrology* 55 (1982); 3-23.
- Bryant, M.D. 1980. Evolution of large organic debris after timber harvest: Maybeso Creek, 1949 to 1978. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report, PNW-101. 30 p.

- _____. 1983. The role and management of woody debris in west coast salmonid nursery streams. *North American Journal of Fisheries Management* 3:322-330.
- Burgeson, C.M. 1985. Memo to Ken Wetring, Interdisciplinary Team Leader, 1986-90 Update, Memo on file at Tongass National Forest, Chatham Area, Sitka, AK.
- Campbell, T.M., III. 1979. Short-term effects of timber harvests on pine marten ecology. M.S. Thesis, Colorado State University, Ft. Collins, CO. 71 p.
- Chamberlin, T.W. 1982. Timber harvest. *in* Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America. General Technical Report PNW-136. Pacific Northwest Forest and Range Experiment Station, USDA Forest Service, Portland, OR.
- Christner, J. and R.D. Harr. 1982. Peak streamflows from the transient snow zone, western cascades, Oregon. Presented at the Western Snow Conference, April 20, 1982, Reno, NV.
- Clean Water Act. December 27, 1977. Public Law 95-217, 91 Stat. 1566; US Code 1982 Title 33, Sections 1251 *et seq.*
- Coastal Zone Management Act. July 25, 1976. Public Law 94-370, 90 Stat. 1013; US Code 1982 Title 16, Sections 1451 *et seq.*
- Cohen, K. A. 1989. Wrangell harvest study: A comprehensive study of wild resource harvest and use by Wrangell residents. Alaska Department of Fish and Game, Juneau, AK. Technical Paper No. 165.
- Conlan, K.E. and D.V. Ellis. 1979. Effects of wood waste on sandbeds benthos. *Marine Pollution Bulletin* 10:262-267.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States, FWS/OBS-79/31. US Fish and Wildlife Service, Biological Services Program, Washington, D.C. 131 p.
- Darr, D.R. Undated. Potential impact of easing the log export restoration on the Tongass National Forest. Pacific Northwest Forest and Range Experiment Station. 33 p.
- Denney, R. N. 1978. Managing the harvest. pp. 395-408 *in* Schmidt, J. L. and D. L. Gilbert, eds. *Big Game of North America*. Harrisburg, PA: Stackpole Books.
- Downing, R. L. 1980. Vital statistics of animal populations. pp. 247-267 *in* Schemnitz, S.D., ed. *Wildlife Management Techniques*. Washington, D.C.: The Wildlife Society.
- Dufresne, F. and J.P. Williams. 1932. Admiralty Island bear estimate, Tongass National Forest, Southeastern Alaska. USDA Forest Service and Alaska Game Commission. p. 12.
- Elliot, S.T. 1985. A study of land use activities and their relationship to the sport fish resources in Alaska. Vol. 26, July 1, 1984 - June 30, 1985. Federal Aid in Fish Restoration and Anadromous Fish Studies. Alaska Department of Fish and Game Division of Sport Fish, Juneau, AK. 89 p. (Unpublished draft manuscript quoted with permission of the author.)
- Evans, D.L. 1982. Status report on twelve raptors. USDI Fish and Wildlife Service, Special Scientific Report — Wildlife No. 238. Washington, D.C. 68 p.
- Fay, G. and M. Thomas. 1986. Deer hunter economic expenditure and use survey, Southeast Alaska. Habitat Technical Report 86-10. Alaska Department of Fish and Game, Divisions of Habitat and Game, Juneau, AK.
- Firman, A. S. 1989. Draft Technical Paper. Harvest and use of fish and wildlife by residents of Kake, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK. Draft Technical Paper No. 145.

- Flynn, R. 1989. Alaska Department of Fish and Game, Division of Wildlife Conservation, Personal Communication.
- Forest and Rangeland Renewable Resources Planning Act. August 17, 1974. Public Law 93-378, 88 Stat. 476, as amended; US Code Title 16, sections 1600 *et seq.*
- Forest Practices Act. 1978. Amended 1981, 1983. Alaska Statute AS 41.17.010 *et seq.*
- Freese, J.L. 1987. Factors affecting benthic deposition of bark debris at 13 log transfer facilities in Southeastern Alaska: Final Report. Alaska Department of Environmental Conservation, Juneau, AK.
- _____. 1985. Condition of Dungeness crabs, *Cancer magister*, at a benthic deposit of decomposing bark: physical trauma and reduced reproductive success. pp. 223-225 *in* Proceedings of the Symposium on Dungeness Crab Biology and Management, Alaska Sea Grant Report No. 85-3, University of Alaska, April, 1985.
- _____. 1987. Reduced survival and condition of the bivalves *Protothaca staminea* and *Mytilus edulis* buried by decomposing bark. Marine Environmental Research 23:49-64.
- Freese, L. and C. O'Clair. 1984. Responses to the little neck clam (*Protothaca staminea*) and the edible mussel (*Mytilus edulis*) exposed to decomposing wood waste from a log transfer facility. Paper presented at American Fisheries Society, Alaska Chapter, November 12-15, 1984. Juneau, AK.
- General Bridge Act. August 2, 1946. c. 753, 60 Stat. 812, Title 5; US Code 1982 Title 33, Section 525 *et seq.*
- George, G. and R. Bosworth. 1988. Use of fish and wildlife by residents of Angoon, Admiralty Island, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 159.
- Gmelch, G. and S.B. Gmelch. 1985. Resource use in a small Alaskan city—Sitka. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK. Technical Paper No. 90.
- Gibbons, D.R. 1982. Timber harvesting and its influence on salmon management in Southeast Alaska. Ph.D. Dissertation, University of Washington, Seattle, WA.
- Goldsmith, O.S. 1987. The Alaska Review of Social and Economic Conditions. Institute of Social and Economic Research, University of Alaska, Anchorage, AK. 24(3):3.
- Hanlon v. Barton. 1988. Memorandum and Order in the case of *Hanlon v. Barton*, No. J88-025 (District of Alaska) signed November 14, 1988 by J.A. von der Heydt.
- Hanley, T.A., F.L. Bunnell, E.E. Starkey, S.K. Stevenson, and A.S. Harestad. 1984. Habitat relationships of Cervidae (deer) in old-growth forests. Pages 361-367. *in* Society of American Foresters. New forests for a changing world: Proceedings of the 1983 convention of the Society of American Foresters (Portland, Oregon; 16-20 October).
- Harestad, A.S. 1985. Habitat use by black-tailed deer on northern Vancouver Island. Journal of Wildlife Management 49:946-950.
- Harr, R.D. 1976. Forest practices and streamflow in western Oregon. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report, PNW-49.
- _____. 1981. Some characteristics and consequences of snowmelt during rainfall in western Oregon. Journal of Hydrology 53: 277-304.
- _____. 1983. Potential for augmenting water yield through forest practices in western Washington and western Oregon. Water Resources Bulletin Vol. 19, No. 3.

- Heifetz, J., M.L. Murphy, and K.V. Koski. 1986. Effects of logging on winter habitat of juvenile salmonids in Alaskan streams. *North American Journal of Fisheries Management* 6(1): 52-58.
- Holstine, C.M. and A.W. Colltzi. 1984. Fisheries and Hydrology Resource Report Amendment. Documentation of methodology and assumptions of the economic analysis of habitat potential in the 1986-90 Study Area. Unpublished staff paper. USDA Forest Service, Tongass National Forest, Chatham and Stikine Areas, AK.
- Hughes, B. 1989. Personal Communication. USDI, Fish and Wildlife Service, Sitka, AK. March 13, 1989.
- Jackson, R.G. 1986. Effects of bark accumulation on benthic infauna at a log transfer facility in Southeast Alaska. *Marine Pollution Bulletin* 17(6): 258-262.
- Johnson, L. 1980. Brown bear management in Southeastern Alaska. *International Conference on Bear Research and Management* 4:263-270.
- Johnson, L. 1981. Otter and marten life history studies. Federal Aid in Wildlife Restoration. Final Report Project W-17-10; W-17-11, and W-21-1, Job 7.10R. Alaska Department of Fish and Game, Game Division, Sitka, AK.
- Johnson, D. M. 1989. Regional Management Coordinator, Division of Wildlife Conservation, Alaska Department of Fish and Game. Personal Communication.
- Kalmbach, E.R., R.H. Imler, and L.W. Arnold. 1964. The American eagles and their economic status, 1964. USDI Fish and Wildlife Service, Washington, D.C. 35 p.
- Karau, J. 1975. Water transport of wood: the current situation. Environmental Protection Services, Water Pollution Control Directorate, Ottawa, Ontario. Representative No. EPS3-WP-75-3. 72 p.
- Kookesh, M. and K. Leghorn. 1985. Timber management and fish and wildlife utilization in selected Southeast Alaska communities: Tenakee Springs, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK. Technical Paper No. 138.
- Kruse, J. and R. Frazier. 1988. Community Reports, Tongass Resource Use Cooperative Survey. Institute of Social and Economic Research, University of Alaska Anchorage in Cooperation with US Forest Service and Alaska Department of Fish and Game, Division of Subsistence.
- Larsen, D.N. 1983. Habitats, movements, and foods of river otters in coastal Southeastern Alaska. M.S. Thesis, University of Alaska, Fairbanks, AK. 149 p.
- Lebeda, C.S. 1980. Nesting and brood rearing ecology of the Vancouver Canada geese on Admiralty Island in Southeast Alaska. M.S. Thesis, South Dakota State University, Brookings, SD. 77 p.
- Lebeda, C.S. and J.T. Ratti. 1983. Reproductive biology of Vancouver Canada geese on Admiralty Island, Alaska. *Journal of Wildlife Management* 47(2):297-306.
- Leghorn, K. and M. Kookesh. 1987. Timber management and fish and wildlife utilization in selected Southeast Alaska communities: Tenakee Springs, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK. Technical Paper No. 136.
- Lindzey, F.G. and E.C. Meslow. 1977. Population characteristics of black bears on an island in Washington. *Journal of Wildlife Management* 41:408-412.
- McCarthy, T. 1988. Food habits of brown bears on Admiralty Island, Southeast Alaska. M.S. Thesis, University of Alaska, Fairbanks. In press.
- McDowell Group. 1988. The socioeconomic impacts of the Alaska Pulp Corporation. The McDowell Group, Juneau, AK. 37 p.

- McNay, R.S. and D.D. Doyle. 1987. Winter habitat selection by black-tailed deer on Vancouver Island: a job completion report. Research, B.C. Ministry of Environment and Parks and B.C. Ministry of Forests and Lands. IWIFR-34. Victoria, B.C.
- Mealy, S.P., C.J. Jonkel, and R. Demarchi. 1977. Habitat criteria for grizzly bear management. pp. 276-289 in T. Peterle (ed). Proceedings of the XIII International Congress of Game Biologists. Atlanta, GA. p. 538.
- Meehan, W.R., W.A. Farr, D.M. Bishop, and J.H. Patric. 1969. Some effects of clear-cutting on salmon habitat of two Southeast Alaska streams. USDA Forest Service Research Paper PNW-82. Pacific Northwest Forest and Range Experimental Station, Portland, OR. 45 p.
- Meslow, C.E., C. Maser, and J. Verner. 1981. Old-growth forests as wildlife habitat. Transactions of the North American Wildlife and Natural Resources Conference 46:329-335.
- Mills, M.J. 1986. Alaska Statewide Sport Fish Harvest Study (1985). ADF&G, Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1,27 (RT-2). 137 p.
- Moss, M.L. 1983. Cultural Resource Overview for ALP 1986-90 Operating Period EIS, Hoonah and Sitka Ranger Districts, Chatham Area, Tongass National Forest, MS. on file at Tongass National Forest, Chatham Area, Sitka, AK.
- Multiple-Use Sustained-Yield Act. June 12, 1969. Public Law 86-517, 74 Stat. 215; US Code 1982 Title 16, Sections 528 *et seq.*
- Murphy, M.L. and K.V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. Alaska Fisheries Science Center, Auke Bay Laboratory. National Marine Fisheries Service, NOAA, August 25, 1989, Draft.
- Murphy, M.L., J. Heifetz, S.W. Johnson, K.V. Koski, and J.F. Thedinga. 1986. Effects of clear-cut logging with and without buffer strips of juvenile salmonids in Alaskan streams. Canadian Journal of Fisheries and Aquatic Sciences 43(8):1521-1533.
- Murphy, M.L., J.M. Lorenz, J. Heifetz, J.F. Thedinga, K.V. Koski, and S.W. Johnson. 1987. The relationship between stream classification, fish, and habitat in Southeast Alaska. USDA Forest Service Habitat Management Note, No. 12. R10-MB-10. 63p.
- Murray, D.F. and R. Lipkin. 1987. Candidate threatened and endangered plants of Alaska: with comments on other rare plants. University of Alaska Museum, Fairbanks, AK.
- National Environmental Policy Act. January 1, 1970. Public Law 91-190, 83 Stat. 852; US Code 1982 Title 42, Sections 4321 *et seq.*
- National Forest Management Act. October 22, 1976. Public Law 94-588, 90 Stat. 2949, as amended; US Code 1982 Title 16, sections 1600 *et seq.*
- National Historic Preservation Act. October 15, 1966. Public Law 89-665, 80 Stat. 915; US Code 1982 Title 16, sections 470 *et seq.*
- O'Clair, C. and L. Freese. 1984. Lethal and sublethal responses of dungeness crabs (*Cancer magister*) to bark from log transfer facilities. Paper presented at American Fisheries Society, Alaska Chapter, November 12-15, 1984. Juneau, AK.
- _____. 1985. Responses of Dungeness crabs, *Cancer magister*, exposed to bark debris from benthic deposits at log transfer facilities: survival, feeding, and reproduction. pp. 227-229 in Proceedings of the Symposium on Dungeness Crab Biology and Management, Alaska Sea Grant Report No. 85-3, University of Alaska, April, 1985.
- _____. 1988. Reproductive condition of Dungeness crabs, *Cancer magister*, at or near log transfer facilities in Southeastern Alaska. Marine Environmental Research 26: 57-81.

- Olson, D., C. Schallau, and W. Maki. 1984. Interactive Policy Analysis Simulation System (IPASS) model for Southeast Alaska. Pacific Northwest Forest and Range Experiment Station. General Technical Report PNW-170.
- Paustian, S. J. 1988. Monitoring nonpoint source discharge of sediment from timber harvesting activities in two Southeast Alaska watersheds. Unpublished.
- Peek, J.M., M.R. Pelton, H.D. Picton, J.W. Schoen, and P. Zager. 1987. Grizzly bear conservation and management: a review. *Wildlife Society Bulletin* 15:160-169.
- Rivers and Harbors Act. March 3, 1899. c. 425, 30 Stat. 1151 Section 9; US Code 1982 Title 33, Sections 401 *et seq.*
- Rochelle, J.A. 1980. Mature forests, litterfall, and patterns of forage quality as factors in the nutrition of black-tailed deer on northern Vancouver Island. Ph.D. Dissertation, University of British Columbia, Vancouver, B.C. 295p.
- Rothacher, J. 1965. Streamflow from small watersheds on the western slope of the Cascade range of Oregon. *Water Resources Research*, Vol. 1, No. 1.
- _____. 1970. Increases in water yield following clear-cut logging in the Pacific Northwest. *Water Resource Research*. 6(2):653-658.
- Rothacher, J., C.T. Dryness, and R.L. Fredricksen. 1967. Hydrologic and related characteristics of three small watersheds in the Oregon cascades. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR. 54p.
- Savidge, I. R. and J. S. Ziesenis. 1980. Sustained Yield Management. pp. 405-409 in Schemnitz, S. D., ed. *Wildlife Management Techniques*. Washington, D.C.: The Wildlife Society.
- Schoen, J.W. 1978. Evaluation of deer range and habitat utilization in various successional stages. Federal Aid in Wildlife Restoration Project, Report W-17-10, Job 2.5R. Alaska Department of Fish and Game, Juneau, AK. 22p.
- Schoen, J.W. In Press. Ecology of brown bears on Admiralty Island, Alaska: an overview of ongoing research. Second Glacier Bay Science Symposium, 1988.
- Schoen, J.W. and L.R. Beier. 1986. Brown bear habitat preferences and brown bear logging and mining relationships in Southeast Alaska. Federal Aid in Wildlife Restoration Project, W-22-4. Alaska Department of Fish and Game. p. 45.
- Schoen, J.W. and L.R. Beier. Unpublished data on seasoned brown bear movement patterns. Alaska Department of Fish and Game, Juneau, AK.
- Schoen, J.W., L.R. Beier, J.W. Lentfer, and L.J. Johnson. 1987. Denning ecology of brown bears on Admiralty and Chichagof Islands, Southeast Alaska, and implications for management. *International Conference on Bear Research and Management* 7:293-304.
- Schoen, J.W., M.D. Kirchoff, and M.H. Thomas. 1985. Seasonal distribution and habitat use by Sitka black-tailed deer in Southeast Alaska. Final report, Federal Aid in Wildlife Restoration Project W-17-11, W-21-1, W-22-2, W-22-3, and W-22-4, Job 2.6R. Alaska Department of Fish and Game, Juneau, AK. 44p.
- Schoen, J.W., M.D. Kirchoff, and O.C. Wallmo. 1981. Seasonal distribution and habitat use by Sitka black-tailed deer in Southeast Alaska. Vol. II, Progress Report, Federal Aid in Wildlife Restoration Project W-21-1, Job 2.6R. Alaska Department of Fish and Game, Juneau, AK. 59p.
- Schoen, J.W., J.W. Lentfer, and L.R. Beier. 1986. Differential distribution of brown bears on Admiralty Island, Southeast Alaska: A preliminary assessment. *International Conference on Bear Research and Management* 6:1-5.

- Schoen, J.W. and O.C. Wallmo. 1979. Timber management and deer in Southeast Alaska: Current problems and research direction. pp. 69-85 in Wallmo and Schoen, eds. Proceedings of Sitka Black-tailed Deer Conference. USDA Forest Service, Alaska Region, Juneau, AK.
- Schoen, J.W., O.C. Wallmo, and M.D. Kirchoff. 1979. Seasonal distribution and habitat use by Sitka black-tailed deer in Southeast Alaska. Progress Report, Federal Aid in Wildlife Restoration, Project W-17-11, Job 2.6R. Alaska Department of Fish and Game, Juneau, AK. 64p.
- Schroeder, B. 1989. The effects of intensive timber harvesting on the traditional subsistence fisheries of residents of Hoonah, Alaska. in Development Impacts on Subsistence Fisheries Symposium, 1989, National American Fisheries Society Meeting, Anchorage, AK.
- Schroeder, B. and M. Kookesh. 1988. Areas of subsistence use—Hoonah. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK. Unpublished Draft, Technical Paper No. 142.
- Schwan, M., S. Elliott, and J. Edgington. 1985. Part II. The impacts of clearcut logging on the fisheries resources of Southeast Alaska. pp. 60 - 95 in Sigman, M.J., ed. Impacts of Clearcut Logging on the Fish and Wildlife Resources of Southeast Alaska. Alaska Department of Fish and Game, Habitat Division, Technical Report 85-3. November 1985. 95p.
- Sedell, J.R. and W.S. Duval. 1985. Water transportation and storage of logs. USDA Forest Service, Pacific Northwest Forest Range Experiment Station General Technical Report PNW-186. 68p.
- Sedell, J.R. and F.J. Swanson. 1984. Ecological characteristics of streams in old-growth forests of the Pacific Northwest. pp. 9-16 in Meehan, W.R., T.R. Merrell, Jr., and T.A. Hanley, eds. Fish and Wildlife Relationships in Old-Growth Forests. Proceedings of a Symposium sponsored by Alaska District, American Institute of Fishery Research Biologists Northwest Section, The Wildlife Society, Alaska Council on Science and Technology. Held in Juneau, AK, April 12-15, 1982. Published by the American Institute of Fisheries Research Biology. December 1984.
- Settlement Agreement. 1988. Settlement agreement on all issues in *Tenakee Springs v. Lyng*, No. J84-001 and *Tenakee Springs v. Courtright*, No. J86-024 (District of Alaska) signed April 20, 1988).
- Settlement Agreement. 1989. Settlement agreement between Alaska Pulp Corporation and the United States of America. Signed September 8, 1989.
- Simon, T.L. 1980. An ecological study of the marten in the Tahoe National Forest, California. M.S. Thesis, California State University, Sacramento, CA. 187p.
- Sitka, City and Borough. 1986. Sitka Planning Commission Map for highlighted uses.
- Smythe, C. W. 1988. Harvest and use of fish and wildlife resources by residents of Petersburg, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK. Technical Paper No. 164.
- Soutiere, E.C. 1979. Effects of timber harvesting on marten in Maine. *Journal of Wildlife Management* 43:850-860.
- Spencer, W.D. 1987. Seasonal rest-site preferences of pine martens in the northern Sierra Nevada. *Journal of Wildlife Management* 51:616-621.
- Stalmaster, M.V., R.L. Knight, B.L. Holder, and R.J. Anderson. 1985. Bald eagles. pp. 269-290 in E.R. Brown, ed. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. Part I — Chapter Narratives. USDA Forest Service, Pacific Northwest Region Publication No. R6-F&WL-192-1985. Portland, OR. 332p.

- Swanston, D.N. 1969. The forest ecosystem of Southeast Alaska, #5. Soil mass movement. USDA Forest Service. General Technical Report PNW-17.
- Swanston, D.N. 1985. Relationship of landslides to management practices in Southeast Alaska. Unpublished Study Plan (4352-3.11). USDA Forest Service, Forest Sciences Laboratory, Juneau, AK.
- Swanston, D.N. 1989. A preliminary analysis of landslide response to timber management in Southeast Alaska: An extended abstract, in Proceedings of Watershed '89, A Conference on the Stewardship of Soil, Air and Water Resources. USDA Forest Service Alaska Region R10-MB-77.
- Taylor, R.F. 1934. Yield of second-growth western hemlock-Sitka spruce stands in Southeastern Alaska. Technical Bulletin No. 412. USDA Forest Service.
- Tenakee Springs v. Courtright*. 1987. Memorandum and Order in the case of *Tenakee Springs v. Courtright*, No. J86-024 (District of Alaska) signed June 26, 1987 by J.A. von der Heydt. (Game Creek).
- Thomas, K. 1987. Alaska Seafood Industry Employment 1977-1984. Alaska Department of Labor, Research and Analysis Section.
- Troendle, C.A. and R.M. King. 1985. The effect of timber harvest of the Fool Creek watershed, 30 years later. Water Resources Report 21(12): 1915-1922.
- USDA Forest Service. 1956. Alaska Lumber and Pulp Company Timber Sale Contract. Contract Number 12-11-010-1545. Washington Office, Washington, D.C.
- _____. 1977. Southeast Alaska Area Guide. USDA Forest Service, Juneau, AK. 280p.
- _____. 1978. TLMP-Landtype/Timber Task Force Working Report. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1979a. Tongass Land Management Plan and Final EIS. Series Number R10-57. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1979b. TLMP - Wildlife Task Force Working Report. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1980a. Alaska Lumber and Pulp Company 1981-86 Operating Plan Final Environmental Impact Statement. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1980b. Memorandum of Understanding between the USDA Forest Service and the Alaska Department of Environmental Conservation concerning nonpoint sediment sources. May 16, 1980. J.A. Sandor, Regional Forester and E. Mueller, Commissioner.
- _____. 1982. ALP Life-of-Sale Plan, Twenty-five year harvest projection for Alaska Lumber and Pulp Company Sale Area. (January 1, 1986 through June 30, 2011). USDA Forest Service, Tongass National Forest, Chatham and Sitkine Areas, AK.
- _____. 1983a. Alaska Regional Guide. Alaska Region Report Number 126, USDA Forest Service, Juneau, AK.
- _____. 1983b. Resource Report for the Visual Resource, Sitka and Hoonah Ranger Districts, Chatham Area, Tongass National Forest, APC 1986-90 Operating Period EIS. February 3, 1983.
- _____. 1983c. Resource Report for the Visual Resource, Sitka and Hoonah Ranger Districts, Chatham Area, Tongass National Forest, APC 1986-90 Operating Period EIS. February 3, 1983.

- _____. 1984a. Memorandum of Understanding between USDI Fish and Wildlife Service, Alaska Region, and USDA Forest Service, Region 10 concerning Bald Eagle protection. US Forest Service Manual FSM, February 1984, R-10, Supplement 38.
- _____. 1984b. Addition to the Resource Report for the Visual Resource, Sitka and Hoonah Ranger Districts, Chatham Area, Tongass National Forest, APC 1986-90 Operating Period EIS. January 6, 1984.
- _____. 1985. Status of the Tongass National Forest, 1985 Report. ANILCA, Sec. 706b, Report No. 1. Alaska Region Administrative Document No. 153, April 1986. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1986a. Aquatic Habitat Management Handbook — FSH 2609.24. USDA Forest Service, Juneau, AK.
- _____. 1986b. Alaska Pulp Company 1986-1990 Operating Period Final Environmental Impact Statement. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1986c. Silviculture Examination and Prescription Handbook — FSH 2409.26d. US Department of Agriculture, Forest Service, Juneau, AK.
- _____. 1986d. Tongass Land Management Plan, Amended Winter 1985-86. USDA Forest Service, Alaska Region, Juneau, AK.
- _____. 1986e. Timber Appraisal Handbook — FSH 2409.22. US Department of Agriculture, Forest Service, Juneau, AK.
- _____. 1986f. Resource Reports for Wildlife Habitat: Hoonah, Sitka, and Petersburg Ranger Districts and Amendments. Unpublished.
- _____. 1988a. Alaska Pulp Corporation Long-Term Timber Sale Contract, Draft Supplement to the Environmental Impact Statements for the 1981-86 and 1986-90 Operating Periods, Phase I. USDA Forest Service, Alaska Region, Tongass National Forest, Juneau, Alaska. R10-MB-40. August 1988.
- _____. 1988b. Bald Eagle Habitat Management Activity Review. Alaska Region, June 27, 1988 - July 1, 1988.
- _____. 1988c. Draft Habitat Capability Model for Marten in Southeast Alaska, Unpublished Review Draft.
- _____. 1988d. Status of the Tongass National Forest, 1987 Report, ANILCA 706(b), Report No. 2. Alaska Region, R10-MB-35, March 1988.
- _____. 1988e. Timber Supply and Demand, 1987 Report, ANILCA 706(a), Report No. 7. Alaska Region, May 1988.
- _____. 1988f. Timber Sale Program Annual Report Fiscal Year 1988 Test, Forest Level Information, p. 89.
- _____. 1989a. Draft Assessment of Winter Habitat Capability for Sitka Black-tailed Deer, Unpublished Review Draft.
- _____. 1989b. Timber Supply and Demand. Draft 1988 Report, ANILCA, Sec. 706(a), Report 8. Alaska Region, R10-MB-55.
- _____. 1989c. False Bay Log Transfer Facility Environmental Assessment, Finding of No Significant Impact, and Decision Notice. USDA Forest Service, Alaska Region, Juneau, AK. Document also published in the Phase II Draft SEIS for Analysis Area 3, Appendix B-1.

- _____. 1989d. Seal Creek Log Transfer Facility Environmental Assessment, Decision Notice, and Finding of No Significant Impact. USDA Forest Service, Alaska Region, Juneau, AK. Document also published in the Phase II Draft SEIS for Analysis Area 3, Appendix B-2.
- _____. No Date. Integrated resource inventory interpretations handbook, unpublished report. USFS Tongass National Forest, Chatham Area, Sitka, AK.
- USDI, Fish and Wildlife Service. 1980. Corner Bay boat dock expansion investigations. US Fish and Wildlife Service, Division of Ecological Services, Juneau, AK. July 26, 1980.
- _____. 1983. Field investigations report for alternative proposed log transfer facilities on Chichagof Island, Alaska. US Fish and Wildlife Service, Southeast Alaska Ecological Services, Sitka Substation, Sitka, AK. July 8, 1983
- US Department of Commerce. 1988. Survey of Current Business. US Department of Commerce, Bureau of Economic Analysis. Volume 68, No. 5, May 1988.
- Wallmo, O.C. and J.W. Schoen. 1980. Response of deer to secondary forest succession in Southeast Alaska. *Forest Science* 26(3):448-462.
- Woolington, J.D. 1984. Habitat use and movements of river otters at Kelp Bay, Baranof Island, Alaska. M.S. Thesis, University of Alaska, Fairbanks, AK. 146p.
- Worthern, G.L. and D.L. Kilgore, Jr. 1981. Metabolic rate of pine marten in relation to air temperature. *Journal Mammalogy* 62:624-630.
- Zager, P.E., C.J. Jonkel, and J. Habeck. 1983. Logging and wildfire influence on grizzly bear habitat in northwestern Montana. *International Conference on Bear Research and Management* 5:124-132.

Chapter 8

Glossary

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Acronyms used in text:

ACMP	Alaska Coastal Management Program
ADF&G	Alaska Department of Fish and Game
AHMU	Aquatic Habitat Management Unit
ALP	Alaska Lumber and Pulp Corporation
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
APC	Alaska Pulp Corporation
ASQ	Allowable Sale Quantity
BMP	Best Management Practices
CFL	Commercial Forest Land
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
EVC	Existing Visual Condition
FEIS	Final Environmental Impact Statement
IDT	Interdisciplinary Team
LOD	Large Organic Debris
LTF	Log Transfer Facility
LUD	Land Use Designation
MAI	Mean Annual Increment
MBF	One thousand board feet
MMBF	One million board feet
MELP	Multi-Entry Layout Process
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NOI	Notice of Intent
NRHP	National Register of Historic Places
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RPA	Forest and Rangeland Renewable Resources Planning Act
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
TLMP	Tongass Land Management Plan
TRUCS	Tongass Resource Use Cooperative Study
TTF	Terminal Transportation Facility (equivalent to LTF)
TTSF	Tongass Timber Supply Fund
VCU	Value Comparison Unit
VQO	Visual Quality Objective

Terms used in text:

Adjacent Harvest

Used to indicate when activity is projected to occur near the upper banks of an active stream bank.

Aerial Harvest Systems

Harvesting methods in which the cut logs are moved from the stump to the loading area or log deck without touching the ground. Examples are helicopter and balloon logging.

Age Class Diversity

The amount of age class distribution within a stand. Stands with low age class diversity would be composed of trees of approximately the same age, while stands with high age class diversity would contain trees of many ages.

Alaska Lumber and Pulp Corporation

Now named Alaska Pulp Corporation (APC).

Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 national forest wilderness areas in Southeast Alaska. In section 705(a) Congress directed that at least \$40,000,000 be made available annually to the Tongass Timber Supply Fund to maintain the timber supply from the Tongass National Forest at a rate of 4.5 billion board feet per decade. Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)

Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska natives and for other purposes.

Alaska Pulp Corporation (APC)

Previously Alaska Lumber and Pulp Corporation.

Allocation

Commitment of a parcel of land to one or more kinds of use. Constraints limit the uses of a given parcel to less than the full set of land management options. Land allocations are made in TLMP.

Allowable Sale Quantity (ASQ)

ASQ refers to the maximum quantity of timber that may be sold each decade from the Tongass National Forest. This quantity, expressed as a board foot measure, is calculated per timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management. The ASQ was calculated at 4.5 billion board feet per decade for the Tongass National Forest.

Alpine Zones

The region found on a mountain peak above the tree line.

Anadromous Fish

Anadromous fish (such as salmon, steelhead, and shad) spend part of their lives in freshwater and part of their lives in saltwater.

Analysis Area

An analysis area is a planning unit made up of two or more management areas identified in the Tongass Land Management Plan. This grouping of management areas is consistent with the area analysis direction found in the 1985-86 Tongass Land Management Plan Amendment and with the scope of the Supplement project.

APC Contract Area

Those portions of Baranof, Chichagof, and Kuiu Islands shown on Figures 1-2 and 1-3 in the Final SEIS.

Appraisal

See Timber Appraisal.

Aquatic Habitat Management Unit (AHMU)

A mapping unit that displays an identified value for aquatic resources. It is a mechanism for carrying out aquatic resource management policy.

Class I AHMU: Streams with anadromous or high quality sport fish habitat. Also included is the habitat upstream from a migration barrier known to have reasonable enhancement opportunities for anadromous fish.

Class II AHMU: Streams with resident fish populations and generally steep (6 to 15 percent) gradient (can also include streams from 0 to 6 percent gradient where no anadromous fish occur). These populations have limited sport fisheries values and are separate from the high quality sport fishing systems included in Class I. They generally occur upstream of migration barriers or are steep gradient streams with other habitat features that preclude anadromous fish use.

Class III AHMU: Streams with no fish populations but have potential water quality influence on the downstream aquatic habitat.

Beach Fringe Habitat

Forested habitat that occurs from the intertidal zone inland 600 feet, and islands of less than 50 acres. Beach fringe habitat is an emphasis habitat.

Benthic Habitat

Refers to the substrate and organisms on the bottom of marine environments.

Best Management Practice

A practice or combination of practices that, after problem assessment, examination of alternative practices, and appropriate public participation, is determined by a state to be the most effective and practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals. A BMP is not a site-specific prescription, but an action -initiating mechanism which eventually leads to the interdisciplinary development of a site-specific prescription.

Broadcast Burning

Burning of an area that has been clearcut to remove logging slash from the site. Broadcast burning is done to prepare sites for regeneration or improve wildlife habitat.

Cant

A log partly or wholly cut and destined for further processing.

Capability

An evaluation of a resource's inherent potential for use.

Carryover

Timber volume designated for harvest in a five-year Operating Period, but not harvested during that period. It is, therefore, available for subsequent five-year Operating Periods.

Clearcut

A method of regeneration cutting in which the old crop is completely cut in designated patches. Regeneration in the Alaska Region is usually natural; and the size of the clearcut area rarely exceeds 100 acres.

Climax Forest

A forest in which the species composition and condition of the stand is stable. This is the last stage of succession and does not change if the environment remains unchanged.

Commercial Fishery

Fish, shellfish, or other fishery resources taken or possessed within a designated area for commercial purposes.

Commercial Forest Land (CFL)

Productive forest land that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

Normal CFL: Timber that can be economically harvested with locally available logging systems. Composed of two categories:

Standard: Timber that can be economically harvested with locally available logging systems, such as highlead or short-span skyline.

Special: Timber that is in areas where special consideration is needed to protect other resources but can be harvested with locally available logging systems.

Nonstandard CFL: Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems, such as helicopter or long-span skyline.

Conveyance

The passing of the title of a property from one owner to another.

Cruise

Refers to the general activity, as opposed to a specific method, of determining timber volumes and quality.

Cultural Resources

Historic or prehistoric objects, sites, buildings, structures, and so on that result from past human activities.

Cumulative Effects

Cumulative effects are the impacts on the environment resulting from the addition of the incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions occurring over time.

Cutover

Areas harvested recently.

Deer Winter Range

A combination of environmental elements that support Sitka black-tailed deer under moderately severe or severe winter conditions. Deer winter range is an emphasis habitat.

Deferred VCUs

A deferred VCU is one in which further road construction and/or timber harvest would be deferred until the Supplement document is completed as required by the Court. The Notice of Intent lists all deferred VCUs.

Direct Employment

The jobs that are immediately associated with the Long-Term Contract timber sale, including, for example, logging, sawmills, and pulpmills.

Dispersed Recreation

Recreational activities that are not confined to a specific place.

Draft Environmental Impact Statement

Section 102 of the National Environmental Policy Act (NEPA) requires that a statement of environmental effects for a major Federal action be released to the public and other agencies for comment and review prior to a final management decision.

Eagle Nest Tree Buffer Zone

A 330-foot radius around eagle nest trees established in a Memorandum of Understanding between the US Fish and Wildlife Service and the Forest Service.

Emphasis Habitats

Wildlife habitats identified in the 1986-90 EIS to address wildlife issues relating to timber harvest activities. Those habitats include: deer winter range, inland wetland, beach fringe, estuarine fringe, and streamside riparian.

Emphasis Species

The following categories were used where appropriate: endangered and threatened plant and animal species identified on State and Federal lists; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; nongame species of special interest; additional plant or animals selected because their population changes are believed to indicate effects of management activities on other species of a major biological community or on water quality.

Entry

Harvest of a specific portion of the total rotational volume.

Estuarine Fringe Habitat

A 1,000-foot timbered zone around an estuary. Estuarine fringe is an emphasis habitat.

Estuary

For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominantly mud and grass flats and are unforested except for scattered spruce or cottonwood.

Evaluation Criteria

Predetermined criteria for evaluating alternatives or options.

Existing Visual Condition (EVC)

The level of visual quality or condition presently occurring on the ground. The six existing visual condition categories are:

Type I: These areas appear to be untouched by human activities.

Type II: Areas in which changes in the landscape are not noticed by the average person unless pointed out.

Type III: Areas in which changes in the landscape are noticed by the average person, but they do not attract attention. The natural appearance of the landscape still remains dominant.

Type IV: Areas in which changes in the landscape are easily noticed by the average person and may attract some attention. Although the change in landscape is noticeable, it may resemble a natural disturbance.

Type V: Areas in which changes in the landscape are obvious to the average person. These changes appear to be major disturbances.

Type VI: Areas in which changes in the landscape are in glaring contrast to the natural landscape. The changes appear to be a drastic disturbance.

Feasibility

The opportunity for cost-effective harvest and transportation of timber.

Fish Habitat

The aquatic environment and the immediately surrounding terrestrial environment that, combined, afford the necessary physical and biological support systems required by fish species during various life stages.

Floodplain

The lowland and relatively flat areas joining inland and coastal waters, including debris cones and flood-prone areas of offshore islands; including, at a minimum, that area subject to a 1 percent (100-year recurrence) or greater chance of flooding in any given year.

Forest and Rangeland Renewable Resources Planning Act of 1974. (RPA)

Amended in 1976 by the National Forest Management Act.

Forested Habitat

All areas with forest cover. Used in this final EIS to represent a general habitat zone.

Grabinski

A modified highlead cable logging system.

Habitat Capability

The number of healthy animals that a habitat can sustain. In the Supplement, this term refers to Sitka black-tailed deer and pine marten in all Analysis Areas, and to Sitka black-tailed deer, pine marten, and brown bear in Analysis Areas 2, 3, and 6.

Habitat Improvement

Management of wildlife and fish habitats to increase their capability.

Highlead Cable Logging

A method of transporting logs to a collecting point by using a power cable passing through a block fastened off the ground to lift the front ends of the logs clear off the ground while in transit.

Important Subsistence Use Area

Important Subsistence Use Areas include the “most reliable” and “most often hunted” categories from the TRUCS survey and from subsistence survey data from ADF&G, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Indirect Employment

The jobs in service industries that are associated with the Long-Term Contract timber sale including, for example, suppliers of logging and milling equipment.

Induced Employment

The jobs in the service or governmental sectors that result from increased population or purchases associated with the Long-Term Contract timber sale; includes, for example, restaurant employment.

Inland Wetland Habitat

Lakes, beaver ponds, marsh lands, and associated grass/sedge meadows greater than 10 acres, plus a 500-foot buffer.

Inoperable Timber

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

Interdisciplinary Team (IDT)

A group of people with different backgrounds assembled to solve a problem or perform a task.

Land Use Designation (LUD)

The method of classifying land uses presented in the Tongass Land Management Plan (TLMP). Land uses and activities are grouped to define, along with a set of coordinating policies, a compatible combination of management activities. The following is a description of the four classifications:

LUD I: Wilderness areas.

LUD II: These lands are to be managed in a roadless state in order to retain their wildland character, but this designation would permit wildlife and fish habitat improvement, as well as primitive recreation facility and road development under special authorization.

LUD III: These lands may be managed for a variety of uses. The emphasis is on managing for uses and activities in a compatible and complimentary manner to provide the greatest combination of benefits.

LUD IV: These lands provide opportunities for intensive resource use and development, where the emphasis is primarily on commodity or market resources.

Large Organic Debris (LOD)

Any large piece of relatively stable woody material having a least diameter of greater than 10 centimeters and a length greater than one meter that intrudes into the stream channel.

Layout

Planning and mapping (using aerial photos) of harvest and road systems needed for total harvest of a given area.

Log Transfer Facility (LTF)

A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and siting and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed terminal transfer facility.

Logging Camp

A temporary facility established to house industry and Forest Service personnel while timber harvest occurs in the area.

Logistical Constraints

The short time frame during which the SEIS alternatives could be implemented (before December 31, 1990) causes limitations on the accessibility of harvest areas. The length of time required to acquire permits to construct a log transfer facility, the time required to construct a road, or the time needed to harvest the timber may not fit within the SEIS time frame.

Management Area

An area one or more VCUs in size for which management direction was written in the Tongass Land Management Plan. All or portions of 13 Management Areas are included in the 1986-90 Study Area.

Marginal

Commercial forest land areas that do not qualify as standard or special CFL since they are not operable under short-term (ten years or less) projections of accessibility and economic conditions.

Mass Failure

The downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture, and does not include individual soil particles displaced as surface erosion.

Mean Annual Increment

The total volume of a tree or stand divided by the stand age. The volume may be expressed in cubic feet or board feet per year.

Memorandum and Order

Refers to the Memorandum and Order in the case of Tenakee Springs v. Courtright, No. J86-024 Civil (D. Alaska) Game Creek signed June 24, 1987 and the Memorandum and Order on Port Camden Road/East Kuiu Management Area in the case of Tenakee Springs v. Courtright, No. J86-024 Civil (D. Alaska) Threemile Arm, signed July 31, 1987. Both Memoranda and Orders were signed by James A. von der Heydt, United States District Court Judge for the State of Alaska. Also refers to the Memorandum and Order in the case of *Hanlon v. Barton*, No. J88-025 (District of Alaska) signed November 14, 1988 by J. A. von der Heydt.

Mitigation

These measures include avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Multi-Entry Layout Process

Computerized database located in each area supervisor's office containing information on timber and transportation and TLMP management goals. It is used for planning and economic analyses for the Forest Service administrative area.

National Environmental Policy Act (NEPA)

Passed by Congress in 1969, NEPA declared a national policy to encourage productive harmony between humans and their environment, to promote efforts that will prevent or eliminate damage to the environment and the biosphere and stimulate the health and welfare of humans, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality. This act requires the preparation of environmental impact statements for federal actions that are determined to be of major significance.

National Forest Management Act (NFMA)

A law passed in 1976 that amends the Forest and Rangeland Renewable Resources Planning Act and requires the preparation of Forest plans.

National Register of Historic Places (NRHP)

Official catalogue of cultural resources that are significant in American history, prehistory, architecture, engineering, and culture; maintained by the U.S. Department of the Interior.

Native Allotment

A tract of non-mineral land, not to exceed 160 acres, on which an Alaskan Native (who was 21 years of age or head of a household) established continuous use and occupancy prior to the creation of the National Forests (authorized under the Native Allotment Act of May 17, 1906).

Native Selection

A tract of land on which an Alaska Native, Native group, Village Corporation, or Regional Corporation has made application for ownership as authorized under Sections 12, 14, and 16 of Alaska Native Claims Settlement Act (ANCSA) and as amended by Titles IX and XIV of Alaska National Interest Lands Conservation Act (ANILCA).

Noncommercial Forest Land

Land with more than 10 percent cover of commercial tree species, but not qualifying as commercial forest land.

Nondeferred VCUs

Interim operating areas where scheduled timber harvesting and road construction may take place without further NEPA analysis, as directed by a court-approved settlement and the Notice of Intent.

Nonforest Land

Land that has never supported forests and lands formerly forested but now developed for nonforest uses or land with less than 10 percent cover of commercial tree species.

Nonstandard Harvest Operability

Timber that cannot be harvested with standard equipment and techniques but that would require other systems including balloon, helicopter, or skyline over 2,600 feet, as defined in the TLMP.

Nonstandard Logging Systems

These systems are not in predominant use on the Tongass National Forest. Nonstandard systems include multi-span skyline, long single span skylines (skylines with a reach over 2600 feet), and helicopters.

Normal Harvest Operability

Timber that can be harvested with currently employed standard equipment and predominant techniques such as highlead, A-frame, skyline of less than 2600 feet, and tractor. This is defined as TLMP Operability Class 1.

Notice of Intent (NOI)

Notice of Intent was submitted to indicate an intention to produce an EIS Supplement to the 1981-86 and 1986-90 Operating Plan Environmental Impact Statements for the Alaska Pulp Corporation. The NOI was signed on September 30, 1987.

Old-Growth Forest

Old-growth stands are characterized by trees well past the age of maturity (dominant trees exceed 300 years in age). Stands exhibit declining growth rates and signs of decadence, such as dead and dying trees, snags, and downed woody material. Stands include trees of all ages, multilayered canopies, a range of tree diameter sizes (including very large diameter trees, up to and exceeding 3 meters), and the notable presence of understory vegetation. Old growth stands are defined in the TLMP inventory as those stands having the majority of timber volume in trees more than 150 years of age.

Old-Growth Habitat

Lands identified during the 1986-90 plan process and prescribed for continued management to maintain old-growth forest characteristics through the planning period, subject to further planning and NEPA disclosure.

Operability

Timber suitable for harvest and transport to a market. See inoperable, nonstandard, and normal harvest operability.

Overstory

In a stand with several vegetative layers, the overstory is the uppermost layer, usually formed by the tallest trees.

Planning Record

This is a detailed, formal account of the planning process for the Supplemental EISs. The record contains many forms of data, maps, reports, planning process information, and results of public participation in the planning process. The record provides the basis for the development of the environmental impact statement. For this supplement, the planning record is collectively located at Tongass National Forest field offices in Petersburg, Sitka, and Hoonah, as well as the regional office in Juneau, Alaska.

Potential Yield

The potential yield for the next ten years is the maximum harvest that is possible given the optimum perpetual sustained-yield harvesting level attainable with intensive forestry on regulated areas and considering productivity of the land, conventional logging technology, standard silvicultural treatments, and relationships with other resource uses and the environment.

Precommercial Thinning

The practice of removing some of the trees of less than marketable size from a stand in order to achieve various management objectives.

Prescriptions

A set of treatments or practices designed to develop and/or protect some combination of resources.

Recreation Opportunity Spectrum (ROS)

The framework for planning and managing the recreation resource that consists of six classes from primitive to urban. Each ROS class is defined in terms of its setting and the recreational experiences offered in that setting. Other factors, including the extent to which the natural environment has been modified, the type of facilities developed, and the degree of outdoor skills needed to enjoy the area also play a role in defining the ROS class.

Primitive I: Includes areas out of sight and sound of human activities and greater than 3 miles from roads open to public travel and marine travelways. Provides opportunities for a high degree of interaction with the natural environment, challenge, risk, and the use of outdoor skills.

Primitive II: Area is similar in appearance to Primitive I ROS class; however, is accessible by marine travelway or is within 1/4 mile of low use trails.

Semi-Primitive Nonmotorized: Includes areas greater than 1/4 mile and less than 3 miles from all roads, trails, or readily accessible marine travelways. Provides limited opportunities for isolation from the sights and sounds of humans and a high degree of interaction with the natural environment. Moderate challenge, risk, and the opportunity to use outdoor skills.

Semi-Primitive Motorized: Includes areas less than 1/4 mile from primitive roads, trails or readily accessible marine travelways. Characterized by a predominantly unmodified natural environment with minimum evidence of sights and sounds of humans. Road access is not maintained in these areas.

Roaded Natural: Areas are less than 1/4 mile from roads open to public travel, major power lines, and areas of timber harvest. Areas are characterized by predominantly natural environments with moderate evidence of sights and sounds of humans.

Roaded Modified: Areas are less than 1/4 mile from areas of timber harvest and transportation corridors. Areas are characterized by modified natural environment where utilization practices are common and are for purposes other than recreation.

Rural: Includes those areas with small communities, developed campgrounds, and administrative sites. These areas are characterized by substantially modified natural environments. Sights and sounds of humans are readily evident.

Urban: Areas characterized by substantially urbanized environment. The background may have elements of a natural environment. Timber harvest activities and utilization practices are common. Sights and sounds of humans predominant. Large numbers of visitors can be expected on site and in nearby areas.

Resident Fish

Fish that are not anadromous and that reside in fresh water on a permanent basis. Resident fish include non-anadromous dolly varden char and cutthroat trout.

Retention Factor

The amount of commercial forest land removed from the calculation of the ASQ as an allowance to protect other resource values. These factors are allowances available to draw upon when meeting other resource needs and are not fixed policies to be rigidly applied by the Interdisciplinary Team or Forest Supervisors.

Right-of-Way

The privilege that a person or persons may have of passing over another's land.

Riparian

Areas immediately adjacent to a body of water, the vegetation of which is usually influenced by the water.

Roads, Collector

This functional class of road serves moderate-sized areas and usually connects to a forest arterial or public highway. It collects traffic from forest local roads.

Roads, Local

This functional class of road provides access for a specific resource use activity, such as a timber sale or recreation site, although other minor uses may be served.

Roads, Preplanned

Roads planned in a prior EIS.

Roads, Specified

A road, including related transportation facilities and appurtenances, shown on the Sale Area Map and listed in the Timber Sale Contract.

Roads, Temporary

For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent forest transportation network, and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

ROD Postponed

Timber harvest and/or road construction in VCUs that were postponed by the 1986-90 Record of Decision.

Rotation

The planned number of years (approximately 100 years in Alaska) between the time that a forest stand is regenerated and its next cutting at a specified stage of maturity.

RPA

Forest and Rangeland Renewable Resources Planning Act of 1974.

Salvage Cutting

Cutting primarily to utilize dead/down material resulting from windthrow and scattered poor risk trees that will not be marketable if left in the stand until the next scheduled harvest. Salvage sales must contain more than 50 percent by volume of dead, insect infested, or windthrown timber.

Salvage Sale

A timber sale to use dead and down timber and scattered poor-risk trees that would not be marketable if left in the stand until the next scheduled harvest.

Sawlog

A log considered suitable in size and quality for producing sawn lumber.

Second-Growth Forest

Even-aged stands that will grow back on a site after removal of the previous timber stand.

Selective Cutting

A harvest method in which only some of the trees are removed from the area at one time.

Sensitivity Level

The measure of people's concern for the scenic quality of the National Forests. In 1980, the Tongass National Forest assigned sensitivity levels to land areas viewed from boat routes and anchorages, plane routes, roads, trails, public use areas, and recreation cabins.

Level 1: Includes all seen areas from primary travel routes, use areas, and water bodies where at least three-fourths of the forest visitors have a major concern for scenic quality.

Level 2: Includes all seen areas from primary travel routes, use areas, and water bodies where at least one-fourth of the forest visitors have a major concern for scenic quality.

Level 3: Includes all seen areas from secondary travel routes, use areas, and water bodies where less than one-fourth of the forest visitors have a major concern for scenic quality.

Shelterwood Cutting

A harvest method in which most of the trees are removed in an initial entry, and some trees are left to naturally reseed the area and provide protection to new seedlings that establish on the site. A second entry is conducted later to remove the remaining trees.

Silviculture

Forest management practices that deal with the establishment, development, reproduction, and care of forest trees.

Slash

Debris left over after a logging operation, i.e., limbs, bark, broken pieces of logs.

Soil Hazard Areas

Mapped areas within which various soil hazards may be encountered. Hazards include mass failures and high sediment production during road construction.

Spawning Area

The available area in a stream course that is suitable for the deposition and incubation of salmon or trout eggs.

Species Diversity

The number of different species occurring in a location or under similar environmental conditions.

Standard Logging Systems

Referred to as normal logging systems in the Timber and Silviculture Resource Report. These systems include highlead, A-frame, single span skyline (skyline with a reach less than 2,600 feet), and tractor.

State Historic Preservation Officer (SHPO)

State appointed official who administers Federal and State programs for cultural resources.

Streamside Riparian

Forested areas within 500 feet of anadromous spawning areas.

Study Area

That portion of the sale area that was being studied for 1981-86 and 1986-90 Operating Periods.

Stumpage

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

Subsistence Use

The term “subsistence use” means the customary and traditional uses by rural Alaskan residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.

Successional Stage

One stage in a series of changes affecting the development of a biotic community. On its path to a climax stage the community will pass through several stages of adaptation to environmental changes.

Suitability

An evaluation of a resource’s potential for proposed management activities.

Thousand Board Foot Measure

A method of timber measurement in which the unit is equivalent to 1,000 square feet of lumber one inch thick. It can be abbreviated Mbd, Mbm, or MBF.

Timber Appraisal

Establishing the fair market value of timber by taking the selling value minus manufacturing costs, the cost of getting logs from the stump to the manufacturer, and an allowance for profit and risk.

Timber Sale Contract

Refers to the APC Long-Term Timber Sale Contract in the Supplemental EIS. The Timber Sale Contract is between the Alaska Pulp Corporation and the Forest Service, and is informally referred to by many as the 50-year Contract.

Tongass Land Management Plan (TLMP)

The 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning and the daily uses and activities carried out within the forest. See also Land Use Designation.

Tongass Resource Use Cooperative Study (TRUCS)

A compilation of data on subsistence uses for evaluating the effects of the Forest Service’s action contemplated in the revision of the regional Tongass Land Management Plan.

Tongass Timber Supply Fund (TTSF)

Money established by Congress in ANILCA to make available for harvest 4.5 billion board feet from the Tongass National Forest per decade. The money is used to provide access to marginal timber stands and to allow for protection of other resource values.

Utility Logs

Those logs that do not meet sawlog grade, but are suitable for production of firm useable pulp chips.

Value Comparison Unit (VCU)

These areas, which generally encompass a drainage basin, were established in the Tongass National Forest to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

High Hazard Soils

Soils rated as high for mass wasting hazard will be found under the following conditions: (1) very steep slopes (greater than 75 percent) with infrequent V-notch dissection, stable parent materials, and well drained soils; (2) steep slopes (55 to 75 percent) with frequent V-notch dissection and well drained soils; (3) steep slopes (55 to 75 percent) with infrequent V-notch dissection and inadequately drained soils, or (4) moderately steep slopes with frequent dissection, unstable parent materials, and/or poorly drained soils.

Standard management practices may have only limited success, and on-site investigations are necessary to determine the need for mitigating measures. After timber harvest, sites with high mass wasting hazard may experience 5 to 10 times the average mass wasting occurring on the Forest under natural conditions. As is true of extreme hazard soils, slope failures may occur in increasing numbers from 3 to 7 years after timber harvest and then taper off. Mass wasting and slope failures on these soils are usually considered to be “reclaimed” from management-induced mass wasting after about 15 years.

Moderate Hazard Soils

Soils rated as moderate for mass wasting are generally found in the following conditions: steep slopes (55 to 75 percent) with infrequent V-notch dissection, stable parent materials and well drained soils; moderately steep slopes (35 to 55 percent) with frequent V-notch dissection and well drained soils; moderately steep slopes (35 to 55 percent) with infrequent V-notch dissection and inadequately drained soils, or gentle slopes (5 to 35 percent) with frequent dissection, unstable parent materials and/or poorly drained soils. Standard management practices are usually successful. After timber harvest, moderate hazard soils may experience as much as 5 times the mass wasting experienced on the same soil under natural conditions. Slope failures may occur in increasing numbers from 3 to 7 years after timber harvest and taper off rapidly thereafter. The site can be considered “reclaimed” from management-induced mass wasting when slope failures appear to occur in frequency and magnitude equal to that of natural conditions.

Low Hazard Soils

Soils rated as low for mass wasting hazard are in generally gently sloping and/or rolling topography. In these cases, steep slope gradients will not be combined with dissection, parent materials, or drainage conditions to pose significant mass wasting hazards. Both natural and management-induced mass wasting events are rare and small in extent. Unlike the other soils, these soils will not experience the average five-fold increase in mass wasting after timber harvest. Mitigation is generally effective in reclaiming these sites.

Soil hazard ratings for specific harvest units may be found in the Unit Cards, Appendix A-1. In Analysis Area 6, the relationship between proposed harvest and soil hazard ratings is shown in Table 4-1, at the beginning of this chapter.

Marine Environment

Log transfer facilities are currently in operation in VCU 236 at Corner Bay. Although all LTF sites in Analysis Area 6 have bark accumulation in the marine environment, management objectives outlined in the Tongass Land Management Plan provide for mitigation measures to prevent long-term or irreversible impacts to the marine environment.

Recreation

By the end of the APC Contract period, there would be changes in the recreation opportunities in Analysis Area 6, with a shift from the primitive and semi-primitive opportunities that dominate today to a mix of primitive, semi-primitive, and roaded recreation opportunities.

Additional roads constructed to access harvest units would increase roaded acreage while road management practices including road standards, maintenance, and closures would affect the quality of roaded recreation opportunities. For example, some closed roads may be turned

4 Environmental Consequences

Sitkoh Bay



into hiking trails. Opportunities to engage in current recreation activities, including bear, deer, and waterfowl hunting as well as saltwater and freshwater fishing are expected to continue with modifications to specific areas (see individual VCU narratives below). Also expected to continue are trapping, beach combing, clamming, crabbing, camping, and hiking.

Although the physical recreation setting of Analysis Area 6 would change by 2011, recreation use is not expected to change significantly due to continued limited access. By 2011, approximately 206 miles of road would be constructed and available for recreation use in Analysis Area 6. Commercial recreation operators may provide vehicles for general public use on the roads, providing a potential opportunity for roaded recreation. In general, however, public vehicle access would not be available. Future access to Analysis Area 6, including ferry service or roads connecting to communities with ferry service, is not planned. New roads may be used for hiking by visitors who access the area by boat or used seasonally by Corner Bay camp residents, or other residents of Analysis Area 6.

The recreation opportunities that would be available in each VCU of Analysis Area 6 by the year 2011 were evaluated by examining potential ROS changes. The long-term and cumulative effects, discussed by VCU below would occur under any of the action alternatives.

VCU 235: Opportunities would continue to change from largely semi-primitive and primitive to roaded. The estuary itself would remain in a natural condition with adjacent road access available from Corner Bay, Sitkoh Bay, and False Island. Due to its proximity to Corner Bay, visitation from seasonal Corner Bay logging camp residents is expected to continue and would increase if the camp population increases.

Roadside areas along the estuary would remain natural. However, period traffic volume and noise from harvest operations in the vicinity of the estuary would change the present recrea-

tion experience. The road system would pass through harvested areas, also not attractive for some forms of roadside recreation. Visitation is expected to increase to the Kadashan estuary as road access becomes available from Sitkoh Bay. Private lands in Sitkoh Bay may contain a lodge and vehicles for use by guests.

VCU 236: Recreation opportunities in VCU 236 would continue to be roaded, much the same as they are today. Some areas of the VCU that currently provide semi-primitive and primitive opportunities would also be converted to roaded opportunities. Corner Bay residents are expected to be the major recreational users of the area and would likely pass through VCU 236 on the way to other recreation destinations as well.

VCU 237: More roaded opportunities would be available in the future as roads are constructed. The road along Trap Bay may continue to provide excellent opportunities for roadside recreation, as it would receive limited vehicle traffic when active logging is not in progress. The relatively small size of harvested areas and the unit spacing should provide diversity for recreationists.

Visitors to Trap Bay could hear sounds of logging during active logging periods, especially along the shoreline portion of the road. It is estimated that logging would be occurring during no more than 12 years of the 100 year period, thus providing a desirable area for roaded recreation most of the time. Most shoreline areas would remain in a natural condition, with limited affects to saltwater oriented users.

VCU 238: Recreation opportunities in VCU 238 would change from primarily primitive and semi-primitive to primarily roaded. A road along the coastline would provide opportunities for roadside recreation and possibly beach access for road recreationists. Shoreline areas would remain natural in appearance.

VCU 239: The recreation experience at Kook Lake would be changed as timber is harvested in the vicinity of the lake. The transportation system in the Kook Lake area will be used to transport timber during periods of active logging. The Forest Service cabin at Kook Lake would remain and would become accessible by road. Trail construction opportunities at Kook Lake would remain. Recreationists in VCUs 238 and 239 would access these areas primarily from Corner Bay.

VCU 240: The recreation opportunities would gradually shift from primitive to more roaded each time this VCU is entered. By 2011, VCU 240 will be accessible on the road system from Corner Bay, Sitkoh Bay, and False Island. Road access adjacent to Basket Bay would provide opportunities for roaded recreationists to visit with a short hike to the beach. Future Angoon selections could further modify the existing recreation opportunities within this VCU.

VCU 241: This VCU would provide a mix of roaded and primitive recreation opportunities because the road would extend only along the shoreline and leave a large expanse of land undeveloped in this VCU. The road, which connects with the Sitkoh Bay and False Island road systems, would be heavily used during periods of active logging.

VCU 242: With the exception of the east coast of VCU 242, by 2011 most of this area would provide roaded opportunities.

VCU 243: The Sitkoh Bay estuary would remain largely unmodified while other shoreline areas of the bay would be harvested. Logging roads in the vicinity of the Chatham Cannery and other areas could be managed for future trail systems to provide alpine access and semi-primitive recreation opportunities. If a lodge is developed at the Chatham Cannery, and the operators provide vehicles, the road system around Sitkoh Bay could provide motorized roaded recreational opportunities. Road access to Sitkoh Creek from Corner Bay, as well as the Chatham Cannery, would provide additional opportunities for steelhead anglers.

VCU 244: This VCU, already heavily roaded, would gradually become more roaded each time this VCU is entered for timber harvest. Likewise, the recreation opportunities would be-

4 Environmental Consequences

come more roaded, if the False Island road system is connected to Corner Bay, as well as Sitkoh Bay. If the logging camp is closed down after each entry, the social setting would shift from more primitive when logging was not taking place, to social when logging is in effect. The two cabins and trail at Sitkoh Lake would probably be maintained beyond 2011.

In VCU 245: This VCU would gradually become more roaded each time it is entered for timber harvest. The recreation opportunities would become more roaded as well. The road system is planned to connect to the Corner Bay and Sitkoh Bay road systems, providing further access to those who keep vehicles in the area. If the False Island logging camp is closed down after each entry into VCU 245, the physical setting would remain roaded modified but the social setting would shift from primitive during periods of no logging to more social during periods of logging.

Visual Resources

The potential for visual impact is greatest right after timber is harvested. In the foreground (up to 1/2 mile), stumps and debris are dominant. Activities associated with road construction, such as cut and fill slopes, rock pits, and turn outs would be readily visible to the observer. As seen in the middleground (1/2 mile to 2 miles), vivid distinction in texture of the mature stand and the harvest unit would be apparent. Exposed boles and limbs of the adjacent stand would dominate the visual setting.

The fifth year of regeneration the new forest would be filling out with low lying vegetation (berry bushes, ferns, etc.). In some cases, young alder would be present where disturbance occurred. In the foreground, the visual effects of the clearcut would still be evident, but the

*Kadashan Road Looking
Toward Corner Bay*



shrubby vegetation and young trees would begin to cover over the stumps and exposed ground. In the middleground, the harvest unit would remain evident, with sharp contrast in color and texture.

From year five to twenty, the young trees would establish themselves, reaching a height of approximately fifteen feet. In the foreground, at the end of twenty years, the forest visitor would see a healthy, thinned stand of spruce and hemlock, with some yellow cedar. If views had been created with the original clear cut, they would become limited. The pre-commercial thinning process would create a well defined stand. In the middleground, the contrast between the new forest and the mature forest would be very obvious.

At the end of fifty years, the new forest would reach a height of approximately fifty feet. As seen in the middleground, this stand would be approximately half the height of existing mature stands, providing a smooth visual transition at the harvest unit boundary. Should new harvest occur adjacent to the 50-year stand, the effect would be an even less obvious transition. In the foreground, the growth of the stand would limit views beyond the original unit. At the end of fifty years, the canopy would be closing and the new forest would appear very dense.

Towards the end of eighty years, the stand would reach 75 percent of its mature height. From the middleground there would be less distinction between this stand and adjacent mature forests. The canopy would appear full with crowns touching, allowing little sunlight to reach the forest floor and little understory vegetation to establish. As seen in the foreground, tree boles of 23-inch diameter would be visibly dominant from the road and the canopy visible at approximately thirty feet from the forest floor. Road side vegetation would include ferns and berries.

At 100 years, little difference would be noticed between the 100-year forest and an adjacent overmature forest. Timber would reach approximately 100 feet and appear healthy, lush and with full canopy. In the foreground, the new forest would be extremely dense, with little light reaching the forest floor. Selective harvest or small group selection may be necessary adjacent to recreation roads to allow additional sunlight, for safety purposes, or to increase vista opportunities. In the middleground, the color and texture of the new forest would allow distinction between it and adjacent overmature forests, which display a scattering of dead tops with a generally more irregular tree growth pattern.

Following is a description of the visual condition of each VCU by the year 2011 under the continued implementation of the TLMP and the long term APC contract:

VCU 235: Most areas would appear in a predominantly natural condition as seen from the Alaska Marine Highway and small boat route in Tenakee Inlet and the Sensitivity Level 2 use area around Kadashan Bay. Timber on proximal slopes facing Kadashan Bay and the lower drainage of the Kadashan River are scheduled to be managed with extended rotations (LUD III), which would aid in screening harvest activities in the upper drainages. Most harvest activities in the Tonalite Creek drainage would be unseen from saltwater viewing points. Many timber stands in the upper Kadashan River drainage, seen in the foreground from the road, would be harvested in six entries over a 200-year extended rotation to help reduce potential visual impacts and to meet assigned VQOs. Along the main road system viewers could expect to see recent harvest units, young and mature forests, as well as old-growth throughout the entire rotation.

VCU 236: Changes in the Corner Bay area would continue to occur over the entire rotation, as seen from the Alaska Marine Highway and small boat routes in Tenakee Inlet. Timber stands on slopes facing Tenakee Inlet would be harvested over a 120-year extended rotation in order to reduce potential adverse visual impacts. From saltwater travel routes viewers could expect to see continuous activity at the log transfer facility and logging camps. Regenerating harvest units, recently harvested units, young and mature forests, as well as unharves-

table old-growth would be visible throughout the Corner Bay drainage. Viewers from the road could expect to see this activity in the foreground distance throughout the drainage. Alteration of vegetation would be consistent with modification and maximum modification VQOs.

VCU 237: The majority of VCU 237 would appear in a modified condition when viewed in the middleground from marine traffic routes in Tenakee Inlet. Proposed harvest units would be in a 120-year extended rotation to further aid in reducing potential adverse visual impacts. Long-term visual changes would be consistent with the assigned VQOs.

VCU 238: Harvest activities proposed on the slopes facing Chatham Strait would be visible in the middleground from marine travel routes in Chatham Strait. Timber on these slopes would be harvested in four entries over a 120-year extended rotation to aid in reducing potential adverse visual impacts. Changes to the landscape would be consistent with the assigned modification VQO over the long term. Most harvest areas in the upper drainages would be unseen from the travel routes in Chatham Strait.

VCU 239: Portions of this VCU are visible from the Alaska Marine Highway and small boat route in Chatham Strait and are scheduled to be harvested in multiple entries with a 120-year extended rotation to aid in reducing potential adverse visual impacts. The shoreline area surrounding Kook Lake will be managed as an island lake according to the TLMP, with resultant modified timber harvest scheduling. On the upper slopes around Kook Lake the timber would be harvested in six entries over a 200-year extended rotation to aid in reducing potential visual impacts from the lake and Forest Service recreation cabin. Because of the close viewing distance and the assumption that clearcutting would be the only silvicultural treatment used, meeting the assigned retention VQO around the lake would be difficult throughout the rotation. Changes in the landscape would be more consistent with a partial retention VQO in this area over the long term.

VCU 240: The majority of timber harvesting activities would not be visible to marine travelers in Chatham Strait. From the small plane route along Chatham Strait, harvest operations ranging from recent harvest units to young and mature forests would be visible in this VCU. Changes in the landscape over the long term would be consistent with the assigned modification and maximum modification VQOs.

VCU 241: The shoreline and slopes facing Chatham Strait, visible in the middleground from the Sensitivity Level 1 travel routes, are the most visually sensitive lands in this VCU. Over time, viewers could expect to see a range of visual conditions on these slopes. These varied conditions include past harvest units continuing to regenerate into mature forested stands and new harvesting over a 120-year extended rotation to help in mitigating adverse visual effects. Other areas of VCU 241 would be visible from the small plane route along Chatham Strait. This view would be of a continually changing forest environment ranging from active logging operations to young and mature forested stands. Over the long term, changes in the entire VCU would be consistent with the assigned modification VQO.

VCU 242: Timber on the slopes facing Chatham Strait would be harvested in a 120-year extended rotation to reduce potential adverse visual impacts. Changes in this landscape would be consistent with the assigned modification VQO. Harvest activities occurring in the upper drainages would be visible from the small plane route through the pass from Sitkoh to Chatham. From the air, harvest operations ranging from recent harvest units to young and mature forests would be evident. Over the long term, viewers could expect to see changes consistent with modification and maximum modification VQOs.

VCU 243: Timber at the entrance to Sitkoh Bay and Florence Bay would be harvested in four entries over a 120-year extended rotation to aid in reducing potential adverse visual impacts. Viewers from the small boat route in Sitkoh Bay could expect to see reforestation of clearcuts along the shoreline and new harvest units in adjacent areas. Changes that would occur at the Bay's entrance would be consistent with the assigned modification VQO. From the small

plane route traveling through the pass to Chatham Strait and from the road within the VCU viewers could expect to see intensive harvest operations comparable to past activities in this area. Changes in the landscape over the long term would be consistent with modification and maximum modification VQOs.

VCU 244: Many of the more visually sensitive lands in VCU 244, as seen from the foreground and middleground of the Level 1 Forest Service recreation cabin and trail, have been intensively harvested over the past twenty years. The visual quality objectives for these second-growth forests include an extended rotation. Some of the remaining timber along the lake shore and stream are also scheduled to be managed with an extended rotation. Over the long term, viewers could expect to see past harvest units continuing to regenerate to mature forests and recent harvesting activities on the hillsides on the southern half of this VCU. Most changes to this VCU would be consistent with a modification VQO.

VCU 245: The most visually sensitive lands within this VCU are those slopes facing Peril Strait, which are visible in the middleground from the Alaska Marine Highway, small boat, and plane routes. Much of the timber along the shoreline have been intensively harvested over the past 20 years and have resulted in Type VI visual conditions, which are in strong contrast with the characteristic natural appearing landscape. Timber visible from the Peril Strait travel routes are to be harvested in four entries over a 120-year extended rotation to aid in mitigating further adverse visual effects. Over the long term, viewers could expect to see past harvest units regenerating to mature forests, as well as new units interspersed among the existing timbered slopes. For the most part, changes resulting from future management would be consistent with the modification VQO.

Cultural Resources

Impacts from natural decay, landscape changes, private developments, and timber management activities have combined to destroy or disturb a portion of the cultural resources of Southeast Alaska. Development activities of all kinds pose particular threats to cultural resources because they tend to be located in the same places that cultural resources are found, such as sheltered coastal settings. In addition, areas where landowners have clearcut blocks of land or plan an accelerated period of timber harvest are also of concern.

Because little inventory has taken place in the area, it is impossible to determine the exact nature and number of resources that have been lost. Mitigation measures have only been implemented during recent years. Implementing the No Action Alternative (No. 1) could slightly lessen long-term and cumulative effects on cultural resources. The existing cultural resource compliance review process incorporates a consideration of cumulative effects for the proposed action alternatives on National Forest land. Future timber management activities could combine with other ground-disturbance to result in continued loss of cultural resources. The implementation of various mitigation measures would reduce this loss by preserving significant sites and by providing data on those that cannot be preserved.

Socioeconomic Impacts

The primary socioeconomic impact of a long-term timber harvest would be a shift in log grades resulting from a transition of mature and overmature stands to second growth, affecting the lumber and wood products industry in Southeast Alaska. This impact would fall most heavily on cant producers in the industry, who require select and No. 1 grade spruce and hemlock logs. Some volume of No. 1 grade logs would exist, however, to support some cant manufacture. Due to the primary processing requirements attached to the purchase of National Forest timber, the wood products industry is expected to continue in Southeast Alaska. As long as logs continue to command higher profits per unit than sawn products in Pacific Rim markets, no incentive would likely exist for native land owners or the State to provide logs to the mills.

The potential of expanding the production of dimension lumber and alternative products could result in a positive impact on the lumber and wood products industry. Recent analyses

of alternative product mixes for the Southeast Alaska lumber and wood products industry (Forest Service 1985) indicate that a modest restructuring of the industry could accommodate the harvest of second-growth timber. The product mix associated with this new structure is predicated on current market prices. The restructuring of the industry, although possible with existing prices, would also require investment by the public and/or private sector(s) in new processing facilities.

Pulp production would retain a pivotal relationship in the market for logs and chips in the restructured industry. Cant production, as previously discussed, would be reduced to one-quarter of all volume processed, regardless of source. Lumber production would increase to a level equal to the present cant production. Chip production would remain the same, and the remaining volume (about 10 percent) could result in a plywood substitute.

New markets, lower relative production costs compared to other Pacific Rim countries, investment in existing industry to increase productivity, or an increase in prices for Alaska lumber and wood products would aid in the use of second-growth timber. With the stabilizing of these Alaska wood product exports, some of these conditions, as well as a restructuring of the industry, could take place.

Contribution of Timber from State and Private Lands

Overall demand for Southeast Alaska timber has remained relatively constant over the last six years. Demand for National Forest timber, however, has declined since 1980, as timber supplied from private landowners and Native Corporations almost tripled. During the first half of the 1980s, in response to market demand for logs, harvest on Native Corporation and other private lands has been directed at the more accessible and better quality timber. Timber from Native Corporation and other private lands can be exported as unprocessed logs and are not subject to the "primary manufacture" requirement of National Forest timber. Furthermore, higher quality, unprocessed logs have been in greater demand than the processed wood products from National Forest timber. Timber harvests from private lands throughout Southeast Alaska are expected to range up to 350 million board feet per year until the mid to late 1990s if current market conditions continue. Once these finite high-quality stands of overmature timber are harvested, the remaining less valuable, low volume stands would be more expensive to harvest and more difficult to market. If demand continues at current levels, the demand for National Forest timber would increase when harvests on other ownerships decline and cost differentials narrow.

The major landholders, other than the federal government within or near the APC Contract area, are Native Corporations. They are Sealaska, a regional corporation, and Huna Totem, a village corporation.

ANILCA Section 810 Subsistence Evaluation

Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) requires a Federal agency, having jurisdiction over lands in Alaska, to evaluate the potential effects of proposed land-use activities on subsistence uses and needs. Section 810 of ANILCA states:

In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the agency having primary disposition over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such federal agency

1. gives notice to the appropriate state agency and appropriate local committees and regional councils established pursuant to ANILCA Section 805;
2. gives notice of, and holds, a hearing in the vicinity of the area involved; and
3. determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands; (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition; and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such action.

As noted in Chapter 3, the 1981-86 Record of Decision (ROD) preceded the passage of ANILCA. The Federal District Court, in *Tenakee Springs v. Courtright*, did not decide if the Forest Service complied with Section 810. To ensure that the 1981-86 and 1986-90 Records of Decision do comply with ANILCA, the Forest Service further evaluated the potential effects to subsistence uses resulting from the proposed actions considered in the Supplemental EIS. Since ANILCA, one subsistence evaluation has been made for the area included in Analysis Area 6 for the 1986-90 Record of Decision. The evaluation concluded that the proposed actions would have no or only minor potential impact to subsistence users of Analysis Area 6. In *Hanlon v. Barton*, however, the Federal District Court concluded that the Forest Service must consider the cumulative impacts to subsistence resources and subsistence users of past, proposed, and reasonably foreseeable future activities in conducting an ANILCA Section 810 Subsistence Evaluation. Further, the Court noted that actions need not be connected to be considered as cumulative effects.



Chapter 3 addressed current and historical subsistence uses on northeastern Chichagof Island (Analysis Area 6), by the rural communities of Angoon, Elfin Cove, Gustavus, Haines, Hoonah, Kake, Klukwan, Pelican, Petersburg, Sitka, Tenakee Springs and Wrangell.

This section evaluates how the proposed action alternatives in Analysis Area 6 could affect subsistence resources used by the above communities. The subsistence resource categories evaluated are fish, timber, wildlife, and other foods such as berries and kelp. Effects of the proposed alternatives are evaluated by: (1) changes in abundance or distribution of subsistence resources, (2) changes in access to subsistence resources, and (3) changes in competition from non-subsistence users for those resources. The evaluation determines whether subsistence uses in Analysis Area 6 or portions of Analysis Area 6 would be significantly restricted by any of the proposed action alternatives. To determine this, the evaluation: (1) considers the availability of subsistence resources in the surrounding areas; (2) considers the cumulative impacts of past and foreseeable future activities on subsistence users and resources; (3) looks at potential cultural and socioeconomic implications affecting subsistence users; and (4) focuses on the mapped important subsistence-use areas in Analysis Area 12. (Important Subsistence Area Use Map, in Map Packet.)

The evaluation relies heavily upon the use of wildlife habitat capability models as well as upon ADF&G hunter survey data. (See Consolidated Appendix, Volume II, C-3 for discussion of data adequacy and habitat capability models used.)

Draft SEIS Evaluation

The Draft SEIS Subsistence evaluation for Analysis Area 6 focused on the rural communities that intensively use the area for subsistence purposes. The evaluation projected the potential effects to subsistence resources such as fish, wildlife, other subsistence foods, and timber. The intent of the evaluation was to find whether any proposed alternative "may" significantly restrict subsistence use in the Analysis Area. The findings determined: (1) the proposed action alternatives "may" restrict subsistence use of wildlife; (2) the proposed alternatives would have no or only minor effect on subsistence users for the other categories evaluated; (3) the foreseeable timber harvest schedule prescribed in the Tongass Land Management Plan poses enough potential for affecting subsistence uses to substantiate a finding of "may" restrict subsistence use of wildlife. Based on the findings and the Federal District Court's finding in *Hanlon v. Barton*, Subsistence Hearings were scheduled.

Phase I of the Draft SEIS broadly addressed the availability of other lands suitable for the purpose of the Supplemental EIS. (See discussion in Chapter 2, under sections, Areas Eliminated from Detailed Study 1981-86 EIS and Alternatives Eliminated from Detailed Study in 1986-90 EIS.)

The range of alternatives in the Phase II Draft SEIS, for Analysis Area 6, displayed sensitivity for reducing or eliminating proposed actions on subsistence-use lands. This sensitivity has been carried forward into the FEIS for Analysis Area 6.

Hearings

The hearings and open houses were announced in a letter accompanying the Draft SEIS, mailed June 9, 1989. Letters were sent to the Alaska Department of Fish and Game, Regional Fish and Game Advisory Councils, Local Fish and Game Advisory Committees, and to each Post Office in the eleven communities where hearings were to be held. Announcements were made in newspapers and on radio stations in the northern Chichagof Island vicinity.

An administrative oversight necessitated re-scheduling the hearings from July 10-14 to August 10-12. In late-June, another letter was sent to all people on the EIS mailing list. The letter announcing the hearings also furnished the following information: testimony at the Hearing could be either verbal or written; people unable to attend could have another person submit their written testimony at the hearing; people could send written testimony to the SEIS Team if postmarked on or before the date of the hearing in the community the testimony was given.

An open house, beginning at 2:00 pm, preceded each hearing. People were invited to review information presented in the Draft Supplemental EISs and to ask questions of the planning staff who prepared the documents. Information displayed at the open houses included maps which displayed harvest units and roads being proposed by each Alternative. Harvest units thought to be of particular concern to the hearing community, were highlighted on the maps displayed. The identification of units of possible concern was based upon TRUCS inventory data.

Hearings and open houses scheduled in the vicinity of Analysis Area 6 included:

Hoonah	Aug. 10, 1989	Hoonah City Hall
Point Baker/Port Protection	Aug. 10, 1989	Point Baker Community Hall
Tenakee Springs	Aug. 10, 1989	Community Hall
Wrangell	Aug. 10, 1989	Catholic Parish Hall
Angoon	Aug. 11, 1989	Angoon Town Hall
Pelican	Aug. 11, 1989	Pelican City Hall
Petersburg	Aug. 11, 1989	Forest Service Supervisors Office
Port Alexander	Aug. 11, 1989	Community Hall
Gustavus	Aug. 12, 1989	Gustavus School
Kake	Aug. 12, 1989	Kake High School
Sitka	Aug. 12, 1989	Verstovia School

On August 10, 1989, hearings were held at Hoonah, Point Baker, Tenakee Springs and Wrangell. At Hoonah, sixty one people attended the hearing, twenty nine people gave verbal testimony, and twenty seven pieces of written testimony were accepted by the Hearing Officer. At Point Baker, nine people attended the hearing, six people gave verbal testimony, and eleven pieces of written testimony were accepted by the Hearing Officer. At Tenakee Springs, thirteen people attended the hearing, seven people gave verbal testimony and 1 piece of written testimony was submitted prior to the hearing. At Wrangell, eight people attended the hearing, one person gave verbal testimony, and one pieces of written testimony was accepted by the Hearing Officer.

Drying Herring Roe



4 Environmental Consequences

On August 11, 1989, hearings were held at Angoon, Pelican, Petersburg and Port Alexander. At Angoon, eight people attended the hearing, seven people gave verbal testimony, and 1 piece of written testimony was accepted by the Hearing Officer. At Pelican, 6 people attended the hearing, and two people gave verbal testimony. At Petersburg, eight people attended the hearing and one person gave verbal testimony. At Port Alexander, four people attended the hearing and all gave verbal testimony. No written testimony was received by the Hearing Officers in Pelican, Petersburg and Port Alexander.

On August 12, 1989, hearings were held at Gustavus, Kake and Sitka. At Gustavus, nine people gave verbal testimony at the hearing, and two pieces of written testimony were accepted by the Hearing Officer. At Kake, nine people attended the hearing and all presented verbal testimony. No written testimony was received by the Hearing Officer. At Sitka, seventeen people attended the Hearing, five people gave verbal testimony, and forty pieces of written testimony were accepted by the Hearing Officer.

Citizens in Elfin Cove requested a subsistence hearing also be scheduled at Elfin Cove. This request came shortly before the hearings were scheduled to begin. To accommodate their request would have required a new announcement rescheduling all of the hearings. The Forest Service decided to proceed with the hearings as scheduled. In response to Elfin Cove's request, an open house was scheduled in Elfin Cove on August 14, 1989 to provide an opportunity for fishers fishing out of Elfin Cove and citizens residing in the community the chance to comment on the Draft SEIS. Due to inclement weather, the open house had to be cancelled. One written comment was received from the community of Elfin Cove concerning the hearings.

The hearing transcript of the proceedings for each community can be found in Consolidated Appendix, Volume I, B.

The verbal and written testimony received at the hearings provided important additional information pertinent to the subsistence evaluation for the FEIS in Analysis Area 3.

Final SEIS Findings

Using the information gathered from the hearings and written public comments, the FEIS subsistence evaluation considers, with distinct findings by alternative and by resource category, whether or not there is a significant possibility of a significant restriction of subsistence use. Again, the resource categories evaluated are fish, wildlife, other foods, and timber. As indicated earlier, the evaluation considers the effects by alternative on (1) access, (2) abundance or distribution, (3) and competition for each resource category.

The Alaska Land Use Council's definition of "significantly restrict subsistence use" is one guideline used in the findings. By this definition:

A proposed action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance of, or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by non-rural residents. The responsible line officer must be sensitive to localized, individual restrictions created by any action and make his/her decision after a reasonable analysis of the information available.

The U.S. District Court Decision of Record in *Kunaknana v. Watt* provided additional definitions of "significant restriction of subsistence uses" and are also used as guidelines in the findings. The definitions from *Kunaknana v. Watt* are:

Significant restrictions are differentiated from insignificant restrictions by a process assessing whether the action undertaken shall have no or slight effect as opposed to large

or substantial effects. In further explanation the Director (BLM) states that no significant restriction results when there would be “no or slight” reduction in the abundance of harvestable resources and no occasional redistribution of these resources. There would be no effect (slight inconvenience) on the ability of harvesters to reach and use active subsistence harvesting sites; and there would be no substantial increase in competition for harvestable resources (that is, no substantial increase in hunting by non-rural residents).

Conversely, restrictions for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence-use sites or major increases in....non-rural resident hunting.

In light of this definition the determination (finding) of significant restriction must be made on a reasonable basis, since it must be decided in light of the total subsistence lands and resources that are available to individuals in surrounding areas living a subsistence lifestyle.

The Final SEIS evaluates the availability of subsistence resources in surrounding areas that could be accessed without undue risk or economic hardship to subsistence users.

Chapter 3 concluded that all the VCUs in Analysis Area 6 are used for harvest of subsistence resources. Specific areas within these VCUs, however, are more important for harvesting subsistence resources (Important Subsistence Use Area Map). Some proposed timber harvest units are within mapped important subsistence-use areas. Table 4-37 lists the harvest units by alternative. The locations of the proposed units, found on the alternative maps, are considered in the evaluation and the findings.

Due to the number of proposed timber harvest units located within mapped important subsistence-use areas (Table 4-37), the FEIS reevaluates the use of other available lands. The Phase I Final SEIS addressed the need to harvest timber from Analysis Area 6. Within Analysis Area 6, other areas are theoretically available for timber harvest, however two related factors make it impractical to use them. The first factor involves the logistics of providing timber to Alaska Pulp Corporation to meet Contract obligations for the remainder of the 1986-90 Operating Period and providing for a smooth transition to the next operating period. The SEIS time frame requires that the Forest Service avoid alternatives needing extensive road construction or new log transfer facilities that would involve new or additional permits. The second factor is the limited existing transportation network (road system) within Analysis Area 6. The project time frame constrains where the Forest Service could locate potential timber harvest units and the development of additional action alternatives.

WILDLIFE FINDINGS

The rural communities in the vicinity of Analysis Area 6 harvest a variety of wildlife resources. The 1987 Tongass Resource Use Cooperative Study found that wildlife made up 11 to 44 percent of the per-capita harvest of principal subsistence resources used by the rural communities in the vicinity of Analysis Area 6. The pounds per capita ranged from 26 in Klukwan to 156 in Hoonah.

Abundance or Redistribution

Deer

Deer are an important subsistence resource used by the rural communities in the vicinity of Analysis Area 6. The 1987 Tongass Resource Use Cooperative Study indicated that deer made up 5 to 39 percent of the per-capita harvest of principal subsistence resources harvested by subsistence users of Analysis Area 6. The per-capita harvest of deer ranged from 13 pounds by Klukwan residents to 135 pounds by Tenakee Springs residents.

Table 4-37

Proposed Timber Harvest in Important Subsistence Areas (Unit Numbers)¹

Alternatives						
1	2	3	4	5	6	7
236-10	236-10	236-10	236-10	235-235	235-43	235-71
236-12	236-12	236-12	236-12	235-236	235-45	235-72
239-5	236-31	236-31	237-26	235-237	235-46	235-73
239-6	236-38	236-38	237-27	235-238	235-50	235-74
239-7	236-39	236-39	237-28	235-239	235-51	235-75
	236-40	236-40	237-29	235-240	235-52	236-10
	236-41	236-41	237-30	236-10	235-53	236-12
	236-47	236-47	237-31	236-12	235-54	236-31
	236-49	236-49	238-7	237-26	235-64	236-32
	239-5	238-7	238-8	237-27	235-67	236-34
	239-6	238-8	238-9	237-28	235-77	237-2
	239-7	238-9	238-10	237-29	235-104	237-26
	239-17	238-10	238-11	237-30	236-10	237-27
	239-59	238-11	238-12	237-31	236-12	237-29
	242-94	238-12	238-13	238-7	237-26	237-30
	242-95	238-13	238-14	238-8	237-27	238-1
	242-96	238-14	238-15	238-9	237-28	238-3
	242-218	238-15	238-16	238-10	237-29	238-4
	243-105	238-16	238-17W	238-11	237-30	238-5
	243-106	238-17W	238-17E	238-12	237-31	238-6
	243-108	238-17E	238-18	238-13	238-7	238-7
	243-109	238-18	238-19	238-14	238-8	238-8
	243-111	238-19	238-20	238-15	238-9	238-9
	243-113	238-20	238-21	238-16	238-10	238-10
	243-114	238-21	238-22	238-17W	238-11	238-11
	243-115	238-22	238-23	238-17E	238-12	238-12
	243-129	238-23	238-24	238-18	238-13	238-13
	243-130	238-24	238-25	238-19	238-14	238-14
	243-201	238-25	238-91	238-20	238-15	238-15
	243-203	238-91	238-101	238-21	238-16	238-16
	243-204	238-101	239-5	238-22	238-17W	239-5
		239-5	239-6	238-23	238-17E	239-6
		239-6	239-7	238-24	238-18	239-7
		239-7	242-94	238-25	238-19	239-17
		239-17	242-95	238-91	238-20	239-56
		239-59	242-96	238-101	238-21	239-59
		242-94	242-218	239-5	238-22	239-61

Continued

Table 4-37 (Continued)

**Proposed Timber Harvest in Important Subsistence Areas
(Unit Numbers)¹**

Alternatives						
1	2	3	4	5	6	7
		242-95	243-105	239-6	238-23	239-62
		242-96	243-106	239-7	238-24	242-94
		242-218	243-108	239-17	238-25	242-95
		243-105	243-109	240-234	238-91	242-96
		243-106	243-111	241-226	238-101	242-218
		243-109	243-113	241-227	239-5	243-105
		243-111	243-114	241-228	239-6	243-111
		243-113	243-115	241-229	239-7	243-113
		243-114	243-129	241-230	243-105	243-115
		243-115	243-130	241-231	243-106	243-129
				241-232	243-108	243-130
				241-233	243-109	244-125
				242-217	243-111	244-126
				242-218	243-129	244-148
				242-219	243-130	245-141
				242-220	243-200	245-142
				242-221	243-201	245-149
				242-222	243-202	245-150
				242-223	243-203	245-151
				242-224		245-152
				242-225		
				243-200		
				243-201		
				243-204		
				243-210		
				243-213		
				244-122		
				244-207		
				244-208		
				244-209		
				244-211		
				244-212		

SOURCE: SEIS Planning Record.

NOTE: Refer to alternative maps and the Importance Subsistence Use Area map folded at the back of this document.

¹ Unit numbers are shown by VCU then harvest unit numbers within that VCU. For example, 236-10 is harvest unit 6 in VCU 201.

Hearing testimony emphasized the importance of Analysis Area 6 for harvesting subsistence deer. Several people from Tenakee Springs who testified at the hearings expressed concern about the potential effects the action alternatives could have on deer and deer availability for subsistence needs. "There are years when we are extremely dependent on the subsistence resources in the inlet to survive."

"It's a very important subsistence source for deer...for Sitkans." (Sitka Hearing testimony.)

Chapter 3, Wildlife section, estimates that deer in Alaska Department of Fish and Game (ADF&G) Minor Harvest Area (MHA) 3627 (Figure 3-2), Analysis Area 6, are currently being harvested at levels greater than the current population can sustain. In 1987, the deer harvest in MHA 3308 was greater than the current population could sustain (Consolidated Appendix, Volume I, B-3). In fact, the 1987 deer harvest level in MHA 3308 and the 1988 deer harvest level in MHA 3627 are greater than what the estimated population could have sustained prior to any timber harvest. This assumes, as was pointed out in Chapter 3, that habitat capability projections from the deer model reflect an approximation of deer population. Further, it is based on the determination by ADF&G that the sustainable harvest is 10 percent of the deer population (ADF&G 1989).

It is assumed that actual deer harvest for 1987 and 1988 reflects rural and non-rural community demand for deer in MHAs 3308, 3627 and 3628 (Table 3-12). Based on this assumption, the current demand for deer by rural and non-rural communities exceeds the sustainable supply of deer in Minor Harvest Areas 3308 and 3627. Additional analysis of the 1987 and 1988 ADF&G hunting data indicates the current demand for deer by the rural communities alone exceeds the present sustainable supply of deer in MHA 3308. Thus, current deer abundance (abundance defined as ample deer available for harvest) is below the level needed by the rural communities harvesting deer in Minor Harvest Area 3308.

One hundred thirty-six proposed timber harvest units being considered in the action alternatives are located in the mapped important subsistence-use areas for deer (Alternative Maps, Important Subsistence Use Area Map and Table 4-37). The harvest of the proposed units will effect deer abundance in three of the MHAs in Analysis Area 6. The potential site-specific effects on deer habitat capability (deer habitat capability reflects potential deer abundance) are evaluated in the Wildlife section.

The deer habitat capability analysis in Chapter 3, Wildlife section, indicates past activities have reduced deer habitat capability from less than one percent in MHA 3628 to approximately nineteen percent in MHA 3308 (Table 3-13). The effect on deer abundance from past activities is substantial in MHA 3308.

The analysis in Chapter 4, Wildlife section, indicates that proposed project action alternative effects on habitat capability in Analysis Area 6 range from no effect for Alternatives 2, 3, and 4 in MHA 3628 to approximately a 7 percent reduction for Alternative 3 in MHA 3627 (Table 4-13). Timber harvest proposed in MHA 3308 could reduce habitat capability about another 1 to 3 percent and would increase the cumulative reduction to over 20 percent. This would further increase the substantial reduction in deer abundance.

The deer habitat capability decreases further when effects of past timber harvest are combined with project effects and are carried into the foreseeable future in Analysis Area 6 (Figure 4-2). The reduction in MHA 3227 ranges from just over 7 percent in Alternative 1 to nearly 24 percent in Alternative 6. The reduction in MHA 3308 ranges from 19 percent in Alternative 1 to nearly 26 percent in Alternative 5. Effects on deer abundance are substantial in MHA 3308 for Alternatives 1, 2, 3, 4, 5, 6, and 7 and in MHA 3627 for Alternatives 4, 5, 6, and 7.

Foreseeable changes in local deer herd distribution are expected in VCUs 236, 237, and 238 in MHA 3627 and in VCUs 239, 240, 241, 242, 243, 244, and 245 in MHA 3308 when the age of the second growth on the past and proposed timber harvest units reaches twenty-five years. This conclusion is based on deer habitat utilization studies in Southeast Alaska.

Visual Quality Objectives (VQOs)

Measurable standards reflecting five different degrees of landscape alteration based upon a landscape's diversity of natural features and the public's concern for high scenic quality. The five categories of VQOs are:

Preservation: Permits ecological changes only. Applies to wilderness areas and other special classified areas.

Retention: Provides for management activities that are not visually evident; requires reduction of contrast through mitigation measures either during or immediately after operation.

Partial Retention: Management activities remain visually subordinate to the natural landscape. Mitigation measures should be accomplished within one year of project completion.

Modification: Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form, line, color, and texture so that its visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.

Maximum Modification: Management activities may dominate the landscape. Mitigation measures should be accomplished with five years of project completion.

Volume

Stand volume based on standing net board feet per acre by Scribner Rule.

Volume Class

Volume classes are used to describe the average volume of timber per acre in thousands of board feet (MBF). Following are the seven volume classes and the range of volume each contains.

Volume Classes 1 to 3: Less than 8 MBF/acre (cleared land, seedlings, or pole timber stands).

Volume Class 4: 8 to 20 MBF/acre.

Volume Class 5: 20 to 30 MBF/acre.

Volume Class 6: 30 to 50 MBF/acre.

Volume Class 7: 50+ MBF/acre.

V-notch

A V-shaped stream channel generally on steep, mountainous terrain.

Watershed

The drainage area of a stream.

Wetland

Those areas that are inundated by surface or ground water frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wilderness

An area established by the Federal Government and administered either by the Forest Service, National Park Service, Fish and Wildlife Service, or Bureau of Land Management in order to conserve its primeval character and influence for public enjoyment, under primitive conditions, in perpetuity.

Wildlife Habitat

The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

Wildlife Habitat Management Unit (WHMU)

An area of wildlife habitat identified during the IDT process as having values important to wildlife.

Windthrows

Areas where trees are uprooted by the wind.

Chapter 9

Index

Chapter 9

Index

Alaska Coastal Management Program (ACMP)	1-21
Alaska Department of Fish and Game (ADF&G)	1-18, 2-107, 3-4, 3-5, 3-6, 3-7, 4-38
Alaska Lumber and Pulp Company	1-1, 1-8
Alaska Marine Highway System	3-50, 3-51, 3-52, 4-38, 4-39, 4-68, 4-69, 4-70, 4-72, 4-73
Alaska National Interest Lands Conservation Act (ANILCA)	1-9, 1-11, 1-14, 1-15, 1-19, 107, 2-108, 3-73, 3-74, 4-48
Alaska Native Claims Settlement Act (ANCSA)	1-9, 3-44
Alaska Pulp Corporation (APC)	1-1, 1-3, 1-8, 1-15, 1-20, 2-1, 2-2, 2-92, 2-93, 2-101, 2-103, 2-107, 2-110, 2-111, 2-112, 3-44, 3-64, 4-2, 4-3, 4-32, 4-41, 4-43, 4-47, 4-49, 4-50, 4-51, 4-54, 4-56, 4-65, 4-67, 4-68, 4-71, 4-72
Alaska Pulp Corporation Long-Term Timber Sale Contract	1-1, 1-3, 1-8, 1-20, 2-1, 2-3, 2-92, 2-93, 2-101, 2-103, 2-109 through 2-112, 3-53, 3-64, 4-5, 4-52, 4-53
Alaska Regional Guide	1-1, 2-112, 4-50
Alaska Water Quality Standards	1-20
American Indian Religious Freedom Act of 1978	4-41
Anadromous Fish	2-2, 2-75, 3-3, 3-38, 3-39, 3-65, 3-65, 3-66, 4-34, 4-35, 4-74
Anadromous Fish Habitat	2-75, 3-39, 4-20
ANCSA	1-9, 3-41
ANILCA (see Alaska National Interest Lands Conservation Act)	
APC (see Alaska Pulp Corporation)	
Aquatic Habitat Management Unit (AHMU)	2-100, 3-39, 4-26, 4-30, 4-53, 4-100, 4-111, 4-112, 4-113
Bald Eagle	1-19, 3-35, 3-36, 4-26, 4-70
Baranof Island	1-8,
Basket Bay	3-5, 4-32, 4-35, 4-39, 4-67
Beach Fringe	3-22, 4-14, 4-64
Blowdown	1-14, 2-112, 4-41
Brown Bear	1-19, 3-30, 4-19, 4-20, 4-21, 4-65, 4-67, 4-96, 4-97
Buffer	4-19, 4-21, 4-59, 4-62

Carryover	1-12
CFL (see Commercial Forest Land)	
Chatham	1-9, 1-12, 1-13, 1-14, 2-104, 2-105, 2-113, 4-5, 4-7, 4-29, 4-38, 4-39, 4-40, 4-67, 4-69, 4-76
Clean Water Act	1-20
Coastal Zone Management Act of 1976 (CZMA)	1-21
Commercial Forest Land (CFL)	3-10, 3-11, 3-12, 4-5, 4-55
Contract (see APC Contract)	
Corner Bay	1-13, 1-14, 2-3, 2-20, 2-27, 2-38, 2-48, 2-65, 2-75, 2-103, 2-110, 2-111, 3-1 through 3-4, 3-42, 4-79, 4-80
Council on Environmental Quality	2-2
Crabbing	4-66
Crabs	4-49
Cultural Resources	3-52, 4-47, 4-48, 4-85, 4-114
Cumulative Effects.	1-10, 1-11, 1-19, 1-20, 4-2, 4-4, 4-49 through 4-52, 4-58, 4-62, 64, 4-66, 4-68, 4-70, 4-78
Deer (see Sitka Black-tailed Deer)	
Deer Winter Range	2-75, 3-21, 4-9, 4-12, 4-63
Deferred	1-6, 1-8, 1-9, 1-10, 2-3, 2-20, 2-38, 2-48, 2-65, 4-74
Department of Environmental Conservation	1-20, 4-36
Department of Natural Resources	1-20, 4-37
Eagles (see Bald Eagles)	
Economics	1-17, 2-108
Emphasis Species	2-101, 2-102, 4-19 through 4-26
Erosion	4-35, 4-36
Estuarine Fringe	3-22, 4-16, 4-65
False Island Logging Camp	2-20, 2-27, 2-48, 2-75, 2-110, 2-111, 4-33 through 4-36, 4-47, 4-48, 4-67
False Island LTF	2-103 through 2-106, 2-111, 2-112, 4-66
Federal Register	1-1, 1-10
Fisheries	1-18, 2-100, 2-104, 2-108, 2-115, 3-37, 3-54, 4-26, 4-30, 4-73, 4-111 through 4-113
Fishing	1-17, 2-107, 4-99
Forest and Rangeland Renewable Resources Planning Act of 1974	1-20
Forested Habitat	4-6, 4-18, 4-19, 4-56 through 4-59
Furbearers	4-95
Game Creek	1-10, 1-11

Habitat Capability	2-100, 3-28, 3-32, 4-16, 4-17, 4-18, 4-20, 4-48, 4-58, 4-59, 4-72, 4-73
<i>Hanlon v. Barton</i>	1-12, 2-3, 4-71
Harvest Units	1-8, 1-9, 1-10, 1-15, 2-2, 2-3, 2-20, 2-27, 2-38, 2-48, 2-65, 2-75, 2-100, 2-107, 2-108, 2-111, 4-53
High-Interest Areas	2-104, 2-108
Hoonah	1-12, 3-64, 4-59, 4-88
Hunting	3-71, 4-86 through 4-107
Industry	1-17, 1-18, 4-42, 4-43, 4-70, 4-71
Inland Wetland Habitat	3-22, 4-12, 4-63
Issues	1-3, 1-9, 1-10, 1-11, 1-15, 1-16, 1-17, 1-19, 1-20, 1-22, 1-23, 2-1, 2-2, 2-92, 2-93, 2-100, 2-108, 2-113, 4-1, 4-26
Kadashan	1-13, 1-14, 1-18, 2-20, 2-27, 2-38, 2-48, 2-65, 2-75, 2-104, 2-110, 2-112, 3-1 through 3-3, 4-29 through 4-32, 4-34, 4-35, 4-36, 4-39, 4-40, 4-66, 4-68, 4-72
Kook Lake	4-38, 4-39, 4-40, 4-66, 4-69
Land Otter	3-34, 4-25, 4-70
Land Use Designations (LUDs)	1-13, 1-14, 2-110, 2-111, 2-112, 3-1, 4-50, 4-51, 4-68
Large Organic Debris.....	4-60, 4-61, 4-76, 4-79
Life of Sale Plan	4-50, 4-52, 4-71, 4-72, 4-73
Log Transfer Facilities (LTF).....	1-18, 2-2, 2-3, 2-20, 2-27, 2-38, 2-48, 2-65, 2-75, 2-103 through 2-106, 2-110 through 2-113, 3-15, 3-16, 3-17, 3-37, 3-42, 3-43, 4-36
Logging Camp ..	2-3, 2-27, 2-48, 2-65, 2-75, 2-110, 4-32 through 4-36, 4-41 4-47, 4-48, 4-49, 4-54, 4-66, 4-67, 4-68, 4-74
Long-Term Effects.....	4-52 through 4-114
Long-Term Sale	4-3, 4-43, 4-47, 4-50, 4-72
LUD (see Land Use Designations)	
Marine Highway	4-38, 4-39, 4-68, 4-69, 4-70, 4-72, 4-73
Market Conditions	4-71
Memorandum and Order	1-9, 1-10, 1-15, 4-53
Memorandum of Understanding	4-29, 4-59
Mitigation Measures	1-11, 1-19, 2-1, 2-112, 2-115, 4-108 through 4-114
Moratorium	1-12
National Environmental Policy Act (NEPA)	1-8, 1-19, 2-2, 2-3, 2-102, 4-2, 4-72
National Forest Management Act (NFMA)	1-19, 1-20
National Historic Preservation Act (NHPA)	1-19, 4-41
National Register of Historic Places	4-41
Native Corporations	1-9, 1-10, 4-71
NEPA (see National Environmental Policy Act)	

NFMA (see National Forest Management Act)	
NHPA (see National Historic Preservation Act)	
No Action Alternative	2-2, 2-3, 2-105, 2-108, 4-53
Nondeferred	1-6, 1-8, 1-10, 1-15, 2-3, 2-93
Notice of Intent	1-1, 1-6, 1-10, 1-11, 1-16
Old-Growth Conditions	4-16, 4-65
Old-Growth Forest	3-23
Old-Growth Habitat	1-17, 2-101, 2-102, 4-13, 4-16, 4-58
Operable Commercial Forest Land (CFL)	2-108, 4-3, 4-4, 4-5, 4-51, 4-52, 4-72
Operating Period	1-1, 1-9, 1-10, 1-11, 1-15, 1-18, 1-19, 2-2, 2-3, 2-48, 2-101, 2-107, 2-108, 2-111, 2-112, 3-42, 4-3, 4-33, 4-47, 4-50, 4-60, 4-71, 4-72, 4-73
Operating Plan	1-1, 1-8, 1-9, 1-12, 4-29
Overmature	4-4, 4-26, 4-51, 4-52, 4-53, 4-62, 4-67, 4-70, 4-72, 4-74, 4-78
Phase I	1-1, 1-3, 1-8, 1-11, 1-12, 1-15, 1-16, 1-20, 2-2, 2-3, 2-93, 2-110, 2-111, 2-112, 3-1
Phase II	1-1, 1-3, 1-11, 1-12, 1-15, 1-16, 2-2, 2-3, 2-93
Pine Marten	2-100, 3-32, 3-33, 3-34, 4-24, 4-25, 4-70
Private Lands	4-1, 4-20, 4-31, 4-51, 4-66, 4-71, 4-79
Record of Decision (ROD)	1-9, 1-15, 1-19, 2-3, 2-38, 2-65, 2-75, 2-101, 2-107, 2-110, 3-73, 4-87
Recreation Resources	2-105, 3-45, 4-38 through 4-43, 4-79 through 4-82
Recreational Use	2-105, 3-45, 3-46, 3-47, 3-71, 4-32, 4-35, 4-39
Region 10 Timber Appraisal Handbook	2-109, 4-50
Regional Guide	1-1, 2-108, 2-112, 3-12, 4-52
Resources Planning Act (RPA)	1-19
Rivers and Harbors Act of 1899	1-20
Road Construction	1-1, 1-3, 1-6, 1-8, 1-10, 1-12, 1-14, 2-3, 2-48, 2-65, 2-75, 2-92, 2-100, 2-104, 2-107, 2-110, 4-2, 4-3, 4-20, 4-22, 4-23, 4-29, 4-30, 4-31, 4-33 through 4-37, 4-40, 4-45, 4-48, 4-49, 4-51, 4-73
Roads	1-8, 1-10, 1-15, 1-17, 2-2, 2-3, 2-20, 2-27, 2-38, 2-48, 2-65, 2-75, 2-92, 2-111, 2-112, 3-14, 3-15, 4-58, 4-59, 4-110, 4-111
ROD (see Record of Decision)	
RPA (see Resources Planning Act)	
Salmon	1-17, 2-100, 3-38, 3-59, 3-64, 4-100
Sealaska Corporation	2-48, 3-44
Sediment	2-2, 3-40, 3-41, 4-35, 4-36
Settlement Agreement	1-6, 1-10, 1-15, 2-3, 2-110
Short-Term Effects	4-1

Sitka 1-12, 2-107, 2-111, 2-112, 3-55, 3-64, 4-88
 Sitka Black-tailed Deer 1-19, 2-75, 2-100, 3-26 through 3-28, 3-59, 4-19, 4-65,
 4-91, 4-92
 Sitkoh Bay 2-20, 2-27, 2-38, 2-48, 2-75, 2-103 through 2-106,
 2-110, 2-111, 2-112, 3-38, 3-42, 4-31, 4-32, 4-34, 4-38 through 4-41, 4-54, 4-66, 4-67,
 4-69, 4-72
 Sitkoh Bay LTF 2-20, 2-38, 2-103 through 2-106, 2-110, 2-112, 4-31, 4-32, 4-66
 Soils 3-2 through 3-8, 4-2, 4-77, 4-78, 4-109
 State Forest Practices Act 4-29
 Streamflow 4-34, 4-35, 4-75, 4-77
 Subsistence 1-9, 1-11, 1-12, 1-15 through 1-19, 2-2, 2-107,
 3-61, 3-65, 3-73 through 3-97, 4-86 through 4-107
 Tenakee Inlet 3-3, 3-4, 4-32, 4-38, 4-39, 4-40, 4-68, 4-69
 Tenakee Springs 1-9, 1-10, 1-15, 1-16, 2-107, 2-110, 3-64, 4-59
Tenakee Springs v. Courtright 1-9, 1-10, 1-15, 1-16, 2-110, 3-73, 4-53, 4-87, 4-88
 Threatened and Endangered Species 3-37
 Timber 1-1, 1-3, 1-6, 1-8 through 1-11, 1-13, 1-14, 1-15, 1-17, 1-18, 1-20,
 2-1, 2-3, 2-20, 2-27, 2-38, 2-48, 2-65, 2-75, 2-92, 2-93, 2-100 through 2-103, 2-107
 through 2-110, 2-115, 4-5, 4-8, 4-9, 4-54 through 4-57, 4-104, 4-109
 Tongass Land Management Plan (TLMP) 1-1, 1-8, 1-12, 1-13, 1-14, 1-20,
 2-2, 2-92, 2-108, 2-110, 2-111, 2-112, 3-18, 3-19, 3-22, 3-23, 3-24, 3-27, 3-31, 3-45,
 4-52
 Trap Bay 2-75, 2-110, 3-4, 4-38, 4-40, 4-66
 United States Department of Agriculture 1-8
 Upper Game Creek 1-10, 1-11
 US Army Corps of Engineers 1-20
 Vancouver Canada Goose 3-37, 4-26, 4-73
 Visual Resource 2-104, 2-105, 3-48 through 3-52, 4-43 through 4-47,
 4-82 through 4-85, 4-113, 4-114
 Wilderness 1-9, 1-13, 1-14, 1-18, 2-104, 4-74
 Wildlife 1-14, 1-17, 1-18, 1-19, 2-2, 2-65, 2-75, 2-100, 2-101, 2-102, 2-104, 2-107,
 2-108, 3-17 through 3-37, 4-9 through 4-26, 4-63 through 4-73, 4-109
 Windthrow 4-6, 4-52, 4-65, 4-75

Appendices

Appendix A-1

Unit Cards

DESIGNATIONS, BY DOCUMENT, FOR RENUMBERED UNITS, VCUs 237 and 238

FSEIS UNIT NUMBER	DSEIS UNIT NUMBER	DSEIS ADDENDUM GROUP NUMBER	81-86/86-90 UNIT NUMBER
7	314	27	17
7	315	27	18
7	287	27	237
7	288	27	238
7	289	27	239
8	184	26	26
9	309	24	12
9	313	24	16
9	280	24	230
9	281	24	231
9	285	24	235
10	310	25	13
10	311	25	14
10	312	25	15
10	282	25	232
10	283	25	233
10	284	25	234
11	308	23	11
11	279	23	228
	286	28	236
12	304	17	7
13	274	17	223
13	305	18	8
14	275		224
14	306	18	9
15	276	19	225
15	307	19	10
16	278	22	227
16	277	22	226
17	318	20,21	22
18	303	16	6
19	272	15	221
19	273	15	222
19	302	15	5
20	271	14	220
20	301	14	4
21	317	13	20
21	268	13	215
21	269	13	216
21	270	13	217
21	299	13	2
22	262	12	206
22	263		207
22	300	12	3
23	264	11	209
23	265	11	210
23	266	11	211
23	298	11	1
24	261	8	205
24	267	8	214
25		7	

FSEIS UNIT NUMBER	DSEIS UNIT NUMBER	DSEIS ADDENDUM UNIT NUMBER	81-86/86-90 UNIT NUMBER
26	291	6	14
26	258	6	202
26	260		204
27	320		13
27	257	5	201
27	259		203
28	296	4	98
28	297		99
28	254	4	198
28	255		199
28	256		200
29	294	3	95
29	295		96
29	252	3	195
29	253		196
30	293	2	94
30	251	2	193
31	292	1	91
31	250	1	192

Area 6 - Harvest Units

Mitigation/Enhancement Methods

<u>VCU</u>	<u>Unit #</u>	<u>Recreation</u>	<u>Visual</u>	<u>Wildlife</u>	<u>Soil</u>
235	43		A,B,C,D,E,F,G H,I,J,K,M	A,B,C,D,E,F,G,H	
	45	G,H	H,K		
	46	G,H	H,K		
	50	G,H	H,K		
	51	G,H	D,H,K	A,H,I,J,L	
	52	D,G,H,K	E,H,K		
	53	H	I,K		
	54	G,H	H,K		
	64	G,H	H,K		
	65	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I, J,K,M		
	66	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I, J,K,M		
	67	G,H	H,K	A,H,I,J,L	
	68	A,B,C,E,F,G,H,J	H,K	C,H,J,L,M	
	70	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J	C,H,J,L,M	D,H,N
	71	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N	D,I,L1
	72	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N	D,E,I,L1,L2
	73	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N	
	74	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N	
	75	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	E,H,J,L,N	
	77	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	C,H,I,J,L	
104	A,B,C,E,F,G,H,J		A,B,C,D,F,G,H,I,J, K,M	C,H,I,J,L	
235	A,B,C,E,F,G,H,J		A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N,O	
236	A,B,C,E,F,G,H,J		A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N,O	
237	A,B,C,E,F,G,H,J		A,B,C,D,F,G,H,I,J, K,M	B,E,H,J,K,N,O	
238	A,B,C,E,F,G,H,J		A,B,C,D,F,G,H,I,J, K,M	C,E,H,J,K,N,O	

Area 6 - Harvest Units

Mitigation/Enhancement Methods

<u>VCU</u>	<u>Unit #</u>	<u>Recreation</u>	<u>Visual</u>	<u>Wildlife</u>	<u>Soil</u>
	239	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	C,H,I,J,L,O	C,E,L,L1,L2
	240	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	A,H,I,J,L	
	241	A,B,C,E,F,G,H,J	A,B,C,D,F,G,H,I,J, K,M	C,H,J,L,O	
236	31	A,B,C,E,H	A,B,C,D,F,K,M		C,E
	32	B,C,H	B,C,D,K		L,L1,L2
	34	A,B,C,E,G,H	A,B,C,D,F,H,K		C
	38	A,B,C,E,H	A,B,C,D,F,K,M		
	39	A,B,C,E,H	A,B,C,D,F,K,M		
	40	A,B,C,H	A,B,C,D,K,M		
	41	B,C,H	B,C,K		
	44	B,C,H	B,C,K		
	47	B,C,G,H		A,I,J,L	
	49	B,C,H,L		A,I,J,L	
237	2	A,B,C,E,G,H,I,J	A,B,C,D,F,H,K,M	A,H,I,J,L	
	26		A,B,C,D,F,H,K,M	A,C,H,I,J,K,O	
	27	A,B,C,E,F,G,H	A,B,C,D,F,H,K,M	C,H,I,J,L	C,N
	29	A,B,C,E,G,H	A,B,C,D,F,H,K,M	A,H,I,J,L	
	30	A,B,C,E,G,H	A,B,C,D,F,H,I,K,M		D,L,L1,L2
	26	A,B,C,E,G,H	A,B,C,D,F,H,J,K,M	B,E,H,J,K,O	
	27	A,B,C,F,G,H,I	A,B,C,D,F,H,K,M	B,H,J,K,N,O	L4
	28	A,B,C,E,G,H,I,J, K	A,B,C,D,F,H,K,M	A,H,I,J,L	D,E,F,I,L,L1,L2
	29	A,B,C,E,H,I,J,K	A,B,C,D,F,K,M	C,H,I,J,L	C,N
	30	A,B,C,E,H,I,J	A,B,C,D,F,K,M	B,E,H,J,K,N	D
	31	A,B,C,E,H,I,J,K	A,B,C,D,F,K,M		B,D,N
238	7	B,C,E,G,H,I,J	B,C,D,F,H,K,L,M	B,H,J,L	
	8	A,B,C,E,G,H,I	A,B,C,D,F,H,K,M	A,H,I,J,L	
	9	A,B,C,E,G,I	A,B,C,D,F,H	A,H,J,L	
	10	A,B,C,E,G,I	A,B,C,D,F,H	C,H,J,L	
	11	B,C,F,H,I	B,C,F,H	A,H,I,J,L	
	12	I,J,K	A,B,C,D,F,H,K,M	E,H,J,K,M	
	13	A,B,C,E,G,H,I,K, L	A,B,C,D,F,H,K,M	A,H,I,J,L	
	14	A,B,C,E,G,H,I	A,B,C,D,F,H,K	A,H,I,J,L	
	15	I		A,H,I,J,L	
	16	I		A,H,I,J,L	

Area 6 - Harvest Units

Mitigation/Enhancement Methods

<u>VCU Unit #</u>	<u>Recreation</u>	<u>Visual</u>	<u>Wildlife</u>	<u>Soil</u>
17E	I		A,H,I,J,L	
17W	I		A,H,I,J,L	
18	B,C,E,G,H,I,J	B,C,D,F,H,K,L,M	B,E,H,J,K,N	
19	A,B,C,E,G,H,I,J, K	A,B,C,D,F,H,K,L,M	B,E,H,J,K,N	
20	A,B,C,E,G,H,I,J, K	A,B,C,D,F,H,K,L,M		
21	A,B,C,E,G,H,I,J	A,B,C,D,F,H,K,L,M	B,H,J,K,N	
22	B,C,E,G,H,I,J	B,C,F,H,K	A,H,I,J,L	
23	A,B,C,G,H,I	A,B,C,D,H,K	A,H,I,J,L	
24	B,C,E,G,H,I,J,K	B,C,D,F,H,K,L,M	A,H,I,J,L	C,G,H,L,L2,L4
25	B,C,E,G,H,I,J	B,C,D,F,H,K,L,M	B,E,H,J,K,N	
91	B,C,G,H,I	C,D,H,K	A,H,I,J,L	C,G
101	I		A,H,I,J,L	D,G,L,L4
239	17 A,B,C,E,F,G,H,I	A,B,C,D,F,G,H,I, J,K,M	A,G,I,J,L	D,G,H,I,L,L1,L5
	59 A,B,C,E,F,G,H,I	A,B,C,D,F,G,H,I, J,K,M	A,G,I,J,L	
	61 B,C,G,H,I	B,C,D,H,K	A,G,I,J,L	B,D
	62 H,I	A,B,C,D	A,G,I,J,L	C,E,F,I,L1, L2,L3,L4,N,P
	56 A,B,C,H	A,B,C,K	A,G,I,J,L	
243	105 D,G,H	D,H,K		
	106 A,B,C,E,F,G,H	A,B,C,F,G,H,K		
	108 G,H	H,K		
	109 A,B,C,E,G,H	A,B,C,F,H,K		
	111	A,C,D,H		
	112 B,C,G,	B,C,H		
	113 B,E,G,H	B,F,H,K		
	114 B,G,H	B,H,K		
	115 A,B,C,E,G,H	A,B,C,F,H,K		
	129 G,H	H,K		
	130 G,H	H,K		
	200 A,B,C,E,F,G,H,I, J	A,B,C,D,F,G,H,I,J,K,M		
	201 A,B,C,E,F,G,H,I, L	A,B,C,D,F,G,H,I,J,K,M		
	202 A,B,C,E,G,I	A,B,C,F,H		
	203 A,B,C,G,H	A,B,C,H,K		D,M,N
	204 G,H	H,K		

Area 6 - Harvest Units

Mitigation/Enhancement Methods

<u>VCU Unit #</u>	<u>Recreation</u>	<u>Visual</u>	<u>Wildlife</u>	<u>Soil</u>
	210 A,B,C,G,I	A,B,C,D,H		
	213 A,B,C,G,H,I,J	A,B,C,H,I,J,K,M		
244	122 A,B,C,E,F,G,H,I	A,B,C,D,F,G,H,J,K,M		A,D,E,P,F,L,L2,L4
	125 A,B,C,E,G,H,I	A,B,C,D,F,H,K,M		L,L4,P,Q
	126 A,B,C,E,G,H,I	A,B,C,D,F,H,K,M		D,L,L1,L2
	148 G,H,I	H,K		D,E,I,L,L1,O
	207 A,B,C,E,F,G,H,I, K	A,B,C,D,F,G,H,K,M		
	208 A,B,C,E,G,H,I	A,B,C,D,F,G,H,K,M		
	209 A,B,C,E,F,G,H,I, K	A,B,C,D,F,G,H,K,M		
	211 G,H,I	H,K		
	212 A,B,C,G,H,I	A,B,C,D,H,K		

AREA 6 ROADS MITIGATION/ENHANCEMENT

<u>ROAD#</u>	<u>SILVICULTURE</u>	<u>SOILS</u>	<u>WILDLIFE</u>	<u>VISUALS</u>	<u>FISHERIES & WATER QUALITY</u>	<u>RECREATION</u>
7520	A		B,C,C1,C4	D,G,H	A,B,C,D	C,D,E,F
75204	A	A,B,C,D,G, I,N	B,C,C1,C4	A,C,D,E,F, G,H	A,B,C,D,E	A,B,C,D,E
75206	A	E,F,H,I	B,C,C1,C4	A,C,D,E,F, G,H		A,B,C,D,E
7521	A,B	A,B,D,E,F, G,H,I	B,C,C1,C4	D,G		C,D,E
7522	A,B	E,F,H,I,J	B,C,C2,C4	D,G		C,D,E
7523	A,B	B,C,D,E,F, G,H,I,J	B,C,C2,C4	A,D,G	A,B,C,D,E	A,C,D,E
7524	A,B		B,C,C2,C4	D,G	A,B,C,D,E	C,D,E
75241	A,B	A,B,D,E,F, G,H	B,C,C2,C4	A,B,C,D,E, F,G,H		A,C,D
7540	A		B,C,C2,C3	A,C,D,E,F, G,H	A,B,C,D,E	A,B,C,D,E,F
75403	A,B	A,B,C,D,E, F,G,H	A,C2	D,G	C,D,E	C,D
754031	A,B		A,C2	D,G		C,D
75406	A,B		B,C,C2,C4	D,G		C,D
75407	A	B,D	B,C,C2,C4	D,G		C,D
75408	A,B	A,B,D,I	B,C,C2,C4	A,C,D,E,F, G,H		A,B,C,D
7541	A,B	E,F,H,I,J	B,C,C2,C4	D,G		C,D,F
75410	A	C,E,F,H,I	A,C2	D,G	B,C,D,E	C,D

AREA 6 ROADS MITIGATION/ENHANCEMENT

<u>ROAD#</u>	<u>SILVICULTURE</u>	<u>SOILS</u>	<u>WILDLIFE</u>	<u>VISUALS</u>	<u>FISHERIES & WATER QUALITY</u>	<u>RECREATION</u>
75412	A,B	E,F,G,H,I, J	A,C2	D,G		C,D
754121	A	A,B,D,I	A,C2	D,G		C,D
75443	A,B	B,D,E,H,I, J	B,C,C1,C4	A,C,D,E,F, G,H		A,B,C,D
75444	A	A,B,C,D,E, I,N	A,C1	A,C,D,E,F, G,H		A,B,C,D
75462	A	E,H,I,J	B,C,C2,C4	A,C,D,E,F, G,H	A,B,C	A,B,C,D
75472	A,B	E,H,I,J	A,C2	D,G	A,B,C,E	C,D
7548	A		A,C2	D,G	A,C,E	C,D
75482	A		A,C2	D,G	A,C,E	CD
75483	A		A,C2	D,G		C,D
75491	A,B	E,F,H,I,J	B,C,C1,C4	A,B,C,D,E, F,G,H		A,B,C,D
754911	A		B,C,C1,C4	A,C,D,E,F, G,H		A,B,C,D
75520	A	A,B,C,D,E, F,G,H,I,N	B,C2,C4	A,C,D,E,F, G,H		A,B,C,D
75521	A	A,B,C,D,E, F,G,H,I,N	B,C,C2,C4	A,C,D,E,F, G,H		A,B,C,D
7553	A,B		B,C,C2,C3	D,G	B,C,D,E	C,D
75531	A,B	A,B,C,D,E, F,G,H,N	B,C,C2,C4	D,G		C,D

AREA 6 ROADS MITIGATION/ENHANCEMENT

<u>ROAD#</u>	<u>SILVICULTURE</u>	<u>SOILS</u>	<u>WILDLIFE</u>	<u>VISUALS</u>	<u>FISHERIES & WATER QUALITY</u>	<u>RECREATION</u>
75532	A	A,B,C,D,I, N	A,C2	D,G	A,C	C,D
75533	A	A,B,C,D,E, G,I	B,C,C1,C4	D,G		C,D
75534	A	A,B,C,D,I	A,C2	D,G		C,D
7620	A,B	A,B,C,D,E, G,H,I,N	B,C,C2,C4	D,G		C,D
76201	A	A,B,D,G,I, L,N	A,C2	D,G	A,B,C,E	C,D
7621	A	A,B,C,D,E, F,G,H,I	B,C,C2,C4	A,B,C,D,E, F,G,H		A,B,C,D

SOILS AND WATER QUALITY GUIDELINES FOR SEIS ROAD CARDS

- A. _____ DESIGN SIDESLOPE CUTS AND FILLS IN UNSTABLE AREAS TO AVOID EXCESSIVE SOIL DISPLACEMENT.
- B. _____ MINIMIZE CONCENTRATION OF ROAD RUNOFF TO PREVENT SATURATION OF FILLS.
- C. _____ IN EXTREMELY UNSTABLE AREAS USE FULL BENCH DESIGN WITH ENDHAUL OF SPOILS.
- D. _____ ON UNSTABLE AREA'S LIMIT BLASTING AND USE OF HEAVY EQUIPMENT IN ROAD PIONEERING WHEN SATURATED SOIL CONDITIONS EXIST.
- E. _____ AVOID LARGE FILL SLOPES ADJACENT TO STREAM COARSES.
- F. _____ KEEP EQUIPMENT OPERATION IN STREAMS AND ON UPPER BANKS TO A MINIMUM
- G. _____ INTENSIVE ROAD DRAINAGE MAINTENANCE REQUIRED OR PUT ROAD TO BED AND REMOVE DRAINAGE STRUCTURES.
- H. _____ DIRECT ROAD RUNOFF INTO FILTER AREAS RATHER THAN INTO STREAMS.
- I. _____ GRASS SEED AND FERTILIZE AREAS OF EXPOSED SOIL WITHIN THE FIRST GROWING SEASON.
- J. _____ LOCATE ROADS PARALLELING STREAMS OR LAKES AT A DISTANCE SUFFICIENT TO PREVENT INTRODUCTION OF SEDIMENT INTO SURFACE WATERS.
- K. _____ EXTREMELY FINE-TEXTURED MARINE TERRACE SOILS (BLUE CLAY) OCCUR ALONG ROAD RIGHT OF WAY.
- L. _____ COMPACT TILL OCCURS ALONG ROAD RIGHT OF WAY.
- M. _____ VOLCANIC ASH SOILS OCCUR ALONG ROAD RIGHT OF WAY.
- N. _____ ROAD LOCATION REQUIRES FIELD REVIEW BY WATERSHED SPECIALIST.

SOILS INPUT TO SEIS PHOTO REVIEW

- A. _____ ON GROUND SITE SPECIFIC SOILS DATA HAS BEEN FOR THIS UNIT.
- B. _____ NO SOILS RELATED CONCERNS FOUND DURING PHOTO REVIEW.
- C. _____ ON GROUND SOILS REVIEW REQUESTED DURING UNIT LAYOUT.
- D. _____ ON GROUND SOILS REVIEW IF UNIT LAYOUT CREW DETERMINES A NEED.
- E. _____ OVERSTEEPEND SLOPES INDICATE EXTREME MASS WASTING HAZARD.
- F. _____ LANDSLIDES ARE ACTIVE/HISTORIC IN THIS AREA.
- G. _____ WINDTHROW IS A RISK.
- H. _____ UNIT LAYOUT LACKS ADEQUATE DEFLECTION.
- I. _____ SHALLOW/INADEQUATELY DRAINED SOILS INDICATE MASS WASTING HAZARDS.
- J. _____ YEARLY SNOW AVALANCHE OCCURS IN THIS AREA.
- K. _____ FLOODING IS FREQUENT IN THIS AREA.
- L. _____ MAJOR/MINOR UNIT DESIGN MODIFICATION NEEDED:
- M. _____ AS INDICATED ON UNIT LAYOUT PHOTO
- N. _____ TO AVOID HIGH HAZARD SOILS
- O. _____ TO AVOID BLIND LEADS THAT RESULT IN SIGNIFICANT SOIL DISTURBANCE
- P. _____ TO AVOID YARDING ACROSS UNSTABLE V-NOTCH SIDESLOPES
- Q. _____ TO INSURE WINDFIRM BOUNDARY
- R. _____ SHRUB COMPETITION LIKELY
- S. _____ <20% SLOPES MAY LACK DEFLECTION IN CABLE YARDING. AREAS THAT MEET SHOVEL
- T. _____ YARDINDING CRITERIA SHOULD BE SO YARDED TO REDUCE SOIL DISTURBANCE AND
REDUCE BRUSH COMPETITION.
- U. _____ FULL SUSPENSION HARVEST SYSTEM NEEDED TO REDUCE IMPACT TO SOIL
- V. _____ ENSURE ONE END LOG LIFT
- W. _____ SPLIT YARD AWAY FROM V-NOTCH
- X. _____ NO FURTHER SOILS REVIEW MAY BE NEEDED.

SILVICULTURE

_____ A. GRASS SEED ROAD RUNNING SURFACE, CUTBANKS AND FILL SLOPES AFTER HARVEST IS COMPLETED TO REDUCE THE FREQUENCY OF ALDER SEED SOURCES AND PROTECT THE ROADBED INVESTMENT.

_____ B. MAINTAIN VEHICULAR ACCESS FOR 5 YEARS AFTER HARVEST IS COMPLETED.

_____ C. NO CONCERN

WILDLIFE RESOURCE MITIGATION/ENHANCEMENT METHODS

VUC NO. _____ UNIT NO. _____ PROPOSED BY: _____ DATE _____

THE FOLLOWING IS A LIST OF APPROPRIATE MANAGEMENT GUIDELINES, MITIGATION & ENHANCEMENT METHODS AND ENVIRONMENTAL CONSEQUENCES TO BE CONSIDERED DURING UNIT AND ROAD LAYOUT & CONSTRUCTION, LOGGING OPERATIONS AND SALE AREA IMPROVEMENT WORK:

- _____ A. UNIT DOES NOT LIE WITHIN EMPHASIS SPECIES HABITAT.
- _____ B. UNIT IS WITHIN DEER WINTER RANGE.
- _____ C. UNIT LIES WITHIN RIPARIAN HABITAT.
- _____ D. UNIT IS LOCATED IN A ESTUARY BUFFER ZONE.
- _____ E. THIS UNIT IS LOCATED IN AN AREA IDENTIFIED IN THE 1986-90 APC FEIS TO PROVIDE OLD GROWTH HABITAT CONDITIONS THROUGH 1990.
- _____ F. A PORTION OF THIS UNIT IS LOCATED IN BEACH FRINGE HABITAT.
- _____ G. UNIT IS LOCATED IN AN AREA WHICH HAS BEEN HEAVILY LOGGED IN THE PAST WITH LIMITED HABITAT DIVERSITY.
- _____ H. UNIT IS LOCATED IN A PREVIOUSLY UNLOGGED DRAINAGE OR HAS HAD LIMITED MODIFICATION ACTIVITY IN THE PAST.
- _____ I. FAVOR TIMBER PRODUCTION OBJECTIVES IN THIS AREA. PROVIDE FOR HABITAT DIVERSITY BY SCHEDULING 5 TO 10 ENTRIES OVER ONE ROTATION PERIOD TO COMPLETE LOGGING OF THE ENTIRE DRAINAGE.
- _____ J. RETAIN AT LEAST 2 SNAGS & DOWN LOGS PER ACRE AND UP TO 2 STANDING CULL LOGS THAT ARE LIKELY TO DIE BEFORE THE END OF THE ROTATION PERIOD TO PROVIDE REPLACEMENT SNAGS.
- _____ K. PROHIBIT VEHICLE ACCESS TO THIS AREA TO PREVENT WILDLIFE DISTURBANCE IN EMPHASIS SPECIES HABITAT.
- _____ L. RESTRICT OR MANAGE ACCESS TO THIS UNIT TO MINIMIZE WILDLIFE DISTURBANCE IF NOT NEEDED TO MEET THE NEEDS OF OTHER RESOURCE NEEDS.
- _____ M. PRESCRIBE PRECOMMERCIAL AND COMMERCIAL THINNING TO PRODUCE OLD GROWTH LIKE CONDITIONS AS SOON AS POSSIBLE (150 YEARS).
- _____ N. PRESCRIBE PRECOMMERCIAL AND COMMERCIAL THINNING TO PRODUCE A WIND FIRM TIMBER STAND AS SOON AS POSSIBLE (150 YEARS). FAVOR HEMLOCK AND SPACE TREES TO PRODUCE STOUT LATERAL BRANCHES.
- _____ O. PRESCRIBE A SANITATION CUT OR LEAVE 3 TO 5 ACRE WINDFIRM ISLANDS WITHIN 600 FT. OF EACH OTHER OR PROVIDE 1 OR 2 LEAVE STRIPS TO PROVIDE A WILDLIFE TRAVEL WAY TO BEACH FRINGE HABITAT.

FISHERIES AND WATER QUALITY GUIDELINES FOR SEIS ROAD CARDS

- A. _____ DESIGN ACTIVITIES ON FLOOD PLAINS TO AVOID RISK OF DAMAGE FROM FLOODWATERS AND TO PROTECT FLOODPLAIN FUNCTION AND VALUES.
- B. _____ MINIMIZE USE OF EQUIPMENT IN STREAMS, FOLLOW TIMING RESTRICTIONS TO AVOID IMPACTS TO SPAWNING AND INCUBATION.
- C. _____ PROVIDE FOR FISH PASSAGE ON ALL STREAMS WITH LESS THAN 4% GRADIENT; EVALUATE POTENTIAL TRADEOFFS FOR NOT PROVIDING PASSAGE ON STREAMS WITH AVERAGE GRADIENTS BETWEEN 4 TO 6%.
- D. ----- LEAVE NATURAL FILTER STRIPS OR SLASH WINDROWS BELOW ROADS TO FILTER SEDIMENT.
- E. _____ DESIGN BRIDGE ABUTMENTS TO MINIMIZE DISTURBANCES TO STREAM BANKS.
- F. _____ ROAD LOCATION REQUIRES FIELD REVIEW BY AQUATIC SCIENTIST.

SJP 9/89

RECREATION RESOURCE MITIGATION/ENHANCEMENT METHODS

VCU NO. _____ UNIT NO. _____ Proposed by: _____ Date: _____

During timber harvest unit and road design, the recreation specialist will implement, from the following list the most appropriate methods to be applied in each circumstance, to meet the recreation resource mitigation/enhancement goals.

- _____ A. Adjust unit boundaries where possible to reduce apparent size and screen bare harvested ground to minimize impact of harvest clearings.
- _____ B. Shape unit boundaries to replicate nearby natural openings and landform shapes.
- _____ C. Locate unit boundaries so unit blends with topographic features such as ridges, knobs, benches and swales.
- _____ D. Design units and roads in specified areas to open vistas selected during layout. Remove slash from roads and units adjacent to vistas.
- _____ E. Locate road to minimize visual impact from key view points.
- _____ F. Use full bench cut and end-haul material where slopes are too steep to hold material and/or where residual trees do not provide enough screen to permit road to meet assigned visual quality objective.
- _____ G. Locate and design rockpits to minimize visual impacts. Retain screen trees where necessary to meet this objective. Fully rehabilitate rockpit area. This includes grading floor to drain, cleanup and finished grading of overburden and waste rock, seeding and planting.
- _____ H. Apply grass seed and fertilizer to all cut and fill banks.
- _____ I. Schedule harvest and roadbuilding activities to minimize years during which activities will occur to reduce impacts from noise.
- _____ J. Areas with potential recreation values and sites will be analyzed on the ground in advance of unit and road location. Roads, turnouts rockpits and unit boundaries will be designed to protect scenic values of identified recreation sites and to provide where appropriate well designed access to recreation features.
- _____ K. Adjust unit boundaries near identified sportfishing areas on stream and lakes to retain approximately 300 ft. of windfirm timber on each side of the waterbody.
- _____ L. Identify and adjust unit boundaries to retain old growth recreation/subsistence access corridors to alpine, etc.

_____ THIS UNIT HAS NO RECREATION MITIGATION CONCERNS; NO FIELD REVIEW NECESSARY.

RECREATION RESOURCE MITIGATION/ENHANCEMENT METHODS

ROAD NO. _____ Proposed by: _____ Date: _____

During timber harvest unit and road design, the recreation specialist will implement, from the following list the most appropriate methods to be applied in each circumstance, to meet the recreation resource mitigation/enhancement goals.

- _____ A. Locate road to minimize visual impact from key view points.
- _____ B. Use full bench cut and end-haul material where slopes are too steep to hold material and/or where residual trees do not provide enough screen to permit road to meet assigned visual quality objective.
- _____ C. Locate and design rockpits to minimize visual impacts. Retain screen trees where necessary to meet this objective. Fully rehabilitate rockpit area. This includes grading floor to drain, cleanup and finished grading of overburden and waste rock, seeding and planting.
- _____ D. Apply grass seed and fertilizer to all cut and fill banks.
- _____ E. Schedule harvest and roadbuilding activities to minimize years during which activities will occur to reduce impacts from noise.
- _____ F. Areas with potential recreation values and sites will be analyzed on the ground in advance of unit and road location. Roads, turnouts rockpits and unit boundaries will be designed to protect scenic values of identified recreation sites and to provide where appropriate well designed access to recreation features.

_____ THIS UNIT HAS NO RECREATION MITIGATION CONCERNS; NO FIELD REVIEW NECESSARY.

VISUAL RESOURCE MITIGATION/ENHANCEMENT METHODS

VCU NO. _____ UNIT NO. _____ PROPOSED BY: _____ DATE _____

During timber harvest unit and road design, the landscape architect will implement, from the following list the most appropriate methods to be applied in each circumstance, to meet the visual quality objectives (VQO) assigned to the 86-90 Operating Period of the APC Long Term Timber Sale area. The following mitigation measures have all proven to be effective in reducing adverse visual impacts resulting from timber harvest and road building activities.

- _____ A. Shape unit boundaries where possible to reduce apparent size and screen bare harvested ground to minimize impact of harvest clearings.
- _____ B. Shape unit boundaries to replicate nearby natural openings and landform shapes
- _____ C. Locate unit boundaries so unit blends with topographic features such as ridges, knobs, benches and swales.
- _____ D. Shape unit boundaries to hide unit backlines and other edges.
- _____ E. Design units and roads in specified areas to open vistas selected during layout. Remove slash from roads and units adjacent to vistas.
- _____ F. Locate road to minimize visual impact from key view points.
- _____ G. Use full bench cut and end-haul material where slopes are too steep to hold material and/or where residual trees do not provide enough screen to permit road to meet assigned visual quality objective.
- _____ H. Locate and design rockpits to minimize visual impacts. Retain screen trees where necessary to meet this objective. Fully rehabilitate rockpit area. This includes grading floor to drain, cleanup and finished grading of overburden and waste rock, seeding and planting.
- _____ I. Landscape architect and project engineer will work on a case by case basis to limit R.O.W. clearing to a minimum as cut and fill slopes permit.
- _____ J. Mitigate the effects of sidecast slash within 30' of the road shoulders by the most appropriate of the following methods - 1) endhaul slash to a central, approved area, and 2) pile slash in non-impacting areas. Consolidate slash as much as practible, cover with soil, and shape to a natural contour.
- _____ K. Apply grass seed and fertilizer to all cut and fill banks, and all abandoned roads.
- _____ L. Burn unit to reduce the adverse effects of color contrast within the first 3 years after unit harvest.
- _____ M. Landscape Architect required on site during layout of unit/road to provide assistance in addressing visual concerns.

VISUAL RESOURCE MITIGATION/ENHANCEMENT METHODS

ROAD NO. _____

PROPOSED BY: _____

DATE _____

During timber harvest unit and road design, the landscape architect will implement, from the following list the most appropriate methods to be applied in each circumstance, to meet the visual quality objectives (VQO) assigned to the 86-90 Operating Period of the APC Long Term Timber Sale area. The following mitigation measures have all proven to be effective in reducing adverse visual impacts resulting from timber harvest and road building activities.

- _____ A. Locate road to minimize visual impact from key view points.
- _____ B. Adjust clearing limits and road location as needed to provide viewpoints in designated locations.
- _____ C. Use full bench cut and end-haul material where slopes are too steep to hold material and/or where residual trees do not provide enough screen to permit road to meet assigned visual quality objective.
- _____ D. Locate and design rockpits to minimize visual impacts. Retain screen trees where necessary to meet this objective. Fully rehabilitate rockpit area. This includes grading floor to drain, cleanup and finished grading of overburden and waste rock, seeding and planting.
- _____ E. Landscape architect and project engineer will work on a case by case basis to limit R.O.W. clearing to a minimum as cut and fill slopes permit.
- _____ F. Mitigate the effects of sidecast slash within 30' of the road shoulders by the most appropriate of the following methods - 1) endhaul slash to a central, approved area, and 2) pile slash in non-impacting areas. Consolidate slash as much as practicable, cover with soil, and shape to a natural contour.
- _____ G. Apply grass seed and fertilizer to all cut and fill banks, and all abandoned roads.
- _____ H. Landscape Architect required on site during layout of road to provide assistance in addressing visual concerns.

CULTURAL RESOURCE MITIGATION/ENHANCEMENT METHODS

Cultural Resources will not be impacted by ground disturbing activities. Cultural resource technicians will evaluate and clear unit prior to activities based on design criteria evaluated by the SHIPO. Those units previously cleared in the 86-90 FEIS will be reevaluated based on the new criteria in the SEIS design plan submitted to SHIPO.

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU <u>235</u>	EIS UNIT # <u>43</u>	ACRES <u>55</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>1391</u>	VOLUME CRUISE	
SALE NAME <u>AA D6</u>			
PHOTO LINE AND NUMBER	<u>276</u>	<u>321</u>	
OBJECTIVES			
OBJECTIVE / PRESCRIPTION: <u>See unit followed by natural regeneration</u> <u>There is a high productivity area (Fanside index 100).</u> <u>Monitor regrowth and pre-consumption, then at 12-18 yrs with a</u> <u>timber emphasis. Retain an acre of 2 snags per acre.</u>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
	<u>None w. upper boundary to east of</u> <u>V-notch on W. boundary to avoid unsuitable</u> <u>shoulder slope.</u>		
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
		<u>Open to high clearance vehicles</u>	
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	<u>Class III</u>	<u>Class II</u>	<u>Class III</u>
OBJECTIVE / PRESCRIPTION:	TEMPERATURE SENSITIVITY: YES	NO	
	<u>MAINTAIN WATER QUALITY IN</u> <u>CLASS III Channel</u> <u>9/89/1000</u>		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> This unit is not located		
	OBJECTIVE / PRESCRIPTION: <u>Within emphasis species habitat.</u> <u>Timber objectives should be favored. Retention of 2 snags and</u> <u>down logs per acre and vehicle access mgmt. will minimize</u> <u>adverse impacts to wildlife.</u> <u>gld</u>		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>		
CULTURAL	Assigned VQO = <u>Mo!</u> unit meets assigned		
	KNOWN SITE	PROBABILITY ZONE: HIGH MEDIUM	
	OBJECTIVE / PRESCRIPTION:		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Highland yard. No specific</u>		
	<u>CONTRACT</u>		
REMARKS	<u>Recreation: See Attached</u>		



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

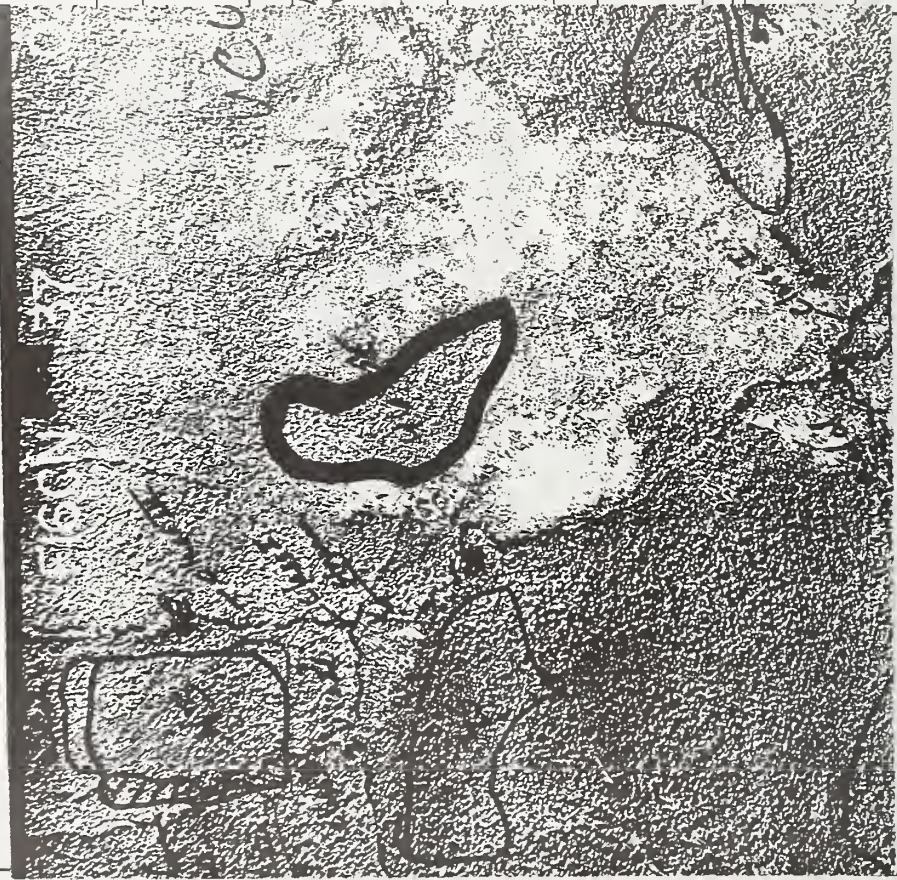
VCU <u>235</u>	EIS UNIT # <u>45</u>	ACRES <u>40</u>	LOGGING SYSTEM
STAND #	VOLUME FEIS <u>905</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER	<u>276</u>	<u>321</u>	
OBJECTIVES			
PLANNED (ORTHO PHOTO) SCALE: _____			



SILVICULTURE	OBJECTIVE / PRESCRIPTION: <i>Planned followed by natural regeneration. This is a high prod. area (Plan 1970). Presumably this is a 12-18 unit or timber density. Within an acre of 25000 per acre for density.</i>		
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
Maintain one end log lift to avoid soil disturbance. NO apparent soils concerns. <i>Plan 9/89</i>			
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE: CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: <i>Discontinue traffic. Allow to grow closed</i>			
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
OBJECTIVE / PRESCRIPTION:	FMU	TEMPERATURE SENSITIVITY: YES — NO —	
NO CONCERNS NOTED. <i>SVI 8/89</i>			
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES — NO. This unit is NOT OBJECTIVE / PRESCRIPTION: <i>located within emphasis species habitat. Emphasis timber objectives here. Retention of 2 snags and or standing coils per acre. Vehicle access mgmt is suggested.</i> <i>SVI</i>		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <i>SEE ATTACHED</i>		
CULTURAL	Assigned V40 = Mbl. unit plots assigned		
LOGGING SYSTEM	KNOWN SITE	PROBABILITY ZONE: HIGH — MEDIUM —	
OBJECTIVE / PRESCRIPTION: <i>Garabinski yard, Fall away from class I stream, maintain buffer.</i>			
REMARKS	<i>Recreation. See Attached</i>		

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU <u>235</u>	EIS UNIT # <u>46</u>	ACRES <u>45</u>	LOGGING SYSTEM <u>H7</u>	OBJECTIVE / PRESCRIPTION: <u>Clearcut followed by natural regeneration. Site work is for 80. Retain 2 acres for deer diversity.</u>
STAND # <u>AA</u>	VOLUME FEIS <u>720</u>	VOLUME CRUISE <u>720</u>		
SALE NAME <u>AA</u>	DATE <u>06</u>			
PHOTO LINE AND NUMBER <u>7-29-76 F12N37 276 321</u>				
OBJECTIVES				
SOILS <u>NO soils concerns</u> <u>RTW 2/89</u>				
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE <u>Open to High Clearance vehicle</u>				
FISHERIES / HYDROLOGY CLASS I CROSSING <u>NO CONCERNS</u> CLASS II CROSSING <u>NO CONCERNS</u> CLASS III CROSSING <u>NO CONCERNS</u> FHMU <u>NO CONCERNS</u> TEMPERATURE SENSITIVITY: YES <u>NO</u> NO <u>NO</u> OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS</u>				
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> THIS UNIT IS NOT OBJECTIVE / PRESCRIPTION: <u>Habitat. This is a timber emphasis species this drainage for several entries over one rotation period to provide for optimum habitat diversity.</u> <u>SEE ATTACHED</u>				
VISUAL RECREATION Assigned VQO - Mod. unit meets assigned OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>				
CULTURAL KNOWN SITE <u>NO</u> PROBABILITY ZONE: HIGH <u>NO</u> MEDIUM <u>NO</u> OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS</u>				
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>Hilthead yard No specific concern.</u>				
REMARKS <u>Recreation. See attached</u>				



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU	235	EIS UNIT	50	ACRES	50	LOGGING SYSTEM	HL
STAND #		VOLUME FEIS	853	VOLUME	CRUISE		
SALE NAME	AA 06						
PHOTO LINE AND NUMBER	276		321				

OBJECTIVES	
SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. Site undergoing from 65 to 80 (Fair) with an average of 72. Retain an average of 2 snags per acre for diversity.

SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:
	NO APPARENT SOILS CONCERNS	
	during photo review of unit. raw 9/89	

ROAD LOCATION AND OBJECTIVE	RESULTS OF MONITORING:		
	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
	DISCOURAGE TRAFFIC ALLOWS GROWS CLOSED		

FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FMU	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION:	NO CONCERNS OBSERVED		

WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES	NO	THIS UNIT IS NOT
	OBJECTIVE / PRESCRIPTION:	located in emphasis species habitat. Timber values should be favored here. Timber harvest should be scheduled so that 5-10 entries over 100 years will be needed to log the entire drainage. Such a harvest schedule will produce optimum habitat diversity.	

RECREATION	ASSIGNED VQO = Max. No. 1	ambients assigned
	SEE ATTACHED	

CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH	MEDIUM
	OBJECTIVE / PRESCRIPTION:		

LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION:
	Hi lead yards no specific concerns

REMARKS	Recapitation: See attached
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81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VQU	235	EIS UNIT #	51	ACRES	25	LOGGING SYSTEM	HL
STAND #		VOLUME FEIS	752	VOLUME CRUISE			
SALE NAME	AA 06						
PHOTO LINE AND NUMBER	276		321				
OBJECTIVES							
PLANNED (ORTHO PHOTO)							
SCALE:							



SILVICULTURE	OBJECTIVE / PRESCRIPTION: <i>See attached by station</i> <i>Aggravation. This is a highly productive area</i> <i>(Farm site Index 100). Monitor regeneration and precommercially thin at age 12-18 yrs. with a timber thinning. Retain an average of 2 swags per acre for diversity.</i>						
SOILS	HIGH HAZARD AREA: <i>oversteeped slopes and VCLIC slide zones indicate potential mass wasting problems. Vetch on S. corner of backline should be avoided by detaching from unit with added on at 3. corner to, marked by RESULTS OF MONITORING: on photo. Request review clearing layout.</i> CLOSED ROAD: <i>Discourage Traffic Allow to Grow</i> OPEN ROAD: <i>few %</i>						
ROAD LOCATION AND OBJECTIVE	<i>Discourage Traffic Allow to Grow</i>						
FISHERIES / HYDROLOGY	CLASS I CROSSING: <i>NO CONCERNS NOTED 9/19/51</i> CLASS II CROSSING: <i>NO</i> CLASS III CROSSING: <i>NO</i> FHMU: <i>NO</i> TEMPERATURE SENSITIVITY: <i>YES</i> <i>NO</i>						
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES: <i>NO</i> OBJECTIVE / PRESCRIPTION: <i>See Attached</i>						
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <i>Assigned VQO - M unit meets assigned</i> <i>SEE ATTACHED</i>						
CULTURAL	KNOWN SITE: <i>NO</i> PROBABILITY ZONE: <i>HIGH</i> <i>MEDIUM</i> OBJECTIVE / PRESCRIPTION: <i>NO</i>						
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <i>Hillside yard. No specific concerns</i>						
REMARKS	<i>Recruitment: See Attached</i>						

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 235 EIS UNIT # 52 ACRES 60 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 1799 VOLUME CRUISE 100
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 36 100

OBJECTIVES _____
 PLANNED (ORTHO PHOTO) _____ SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Site productivity is high (Fair site index 100). Monitor regeneration and periodically thin at age 12-18 yrs. with a timber emphasis. Retain an average of 2 snags per acre for diversity.

SOILS
 HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: split yard away from contour. V-notch to reduce soil disturbance. Exclude unit from V-notch on east boundary 12/0 9/89

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage traffic access to snow closed

FISHERIES / HYDROLOGY
 CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHMU III TEMPERATURE SENSITIVITY: YES _____ NO ✓
 OBJECTIVE / PRESCRIPTION: Follow soils Prescription see 7/89

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO This unit contains no emphasis species habitat. Timber values should be emphasized here. There are no wildlife concerns with this unit except if there is too much timber harvested too soon. Schedule harvest to manage the drainage over one rotation period.

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: _____
SEE ATTACHED
 Assigned VQO = Mod. unit maps assigned

CULTURAL
 KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION: _____

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Hilled and Fall away from creeks, split + yard away from creek in unit

REMARKS
Recreation: See attached.

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>53</u>	ACRES <u>55</u>	LOGGING SYSTEM
STAND #	VOLUME FEIS <u>1463</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER	<u>276</u>	<u>321</u>	
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut to be done by natural regeneration. Site under canopy from 40 to 95 with an average of 75. Retain an average of 2 snags per acre for diversity.</p>			
SOILS		HIGH HAZARD AREA	
<p>On ground soils data FY 82 indicates overstepped slopes. On ground soils review requested at discretion of RTR 9/89</p>		OBJECTIVE / PRESCRIPTION:	
RESULTS OF MONITORING:		DISCOURAGE Traffic Allowance Grow Class	
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:	
FISHERIES / HYDROLOGY		CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —	
OBJECTIVE / PRESCRIPTION:		FNU — TEMPERATURE SENSITIVITY: YES — NO —	
NO CONCERNS NOTED.		5/1 9/89	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES	
<p>NO. No emphasis species this unit. Timber values should be emphasized here. Retain 2 snags in small clumps near the bottom of the unit close to riparian habitat. RESTRICT vehicle</p>		OBJECTIVE / PRESCRIPTION: Access	
VISUAL RECREATION		SEE ATTACHED	
Assigned VPO = Mod.		unit meets assigned	
CULTURAL		KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —	
LOGGING SYSTEM		CONCERNS	
OBJECTIVE / PRESCRIPTION: H/Lead yard No specific			
REMARKS		Recreation; See Attached	



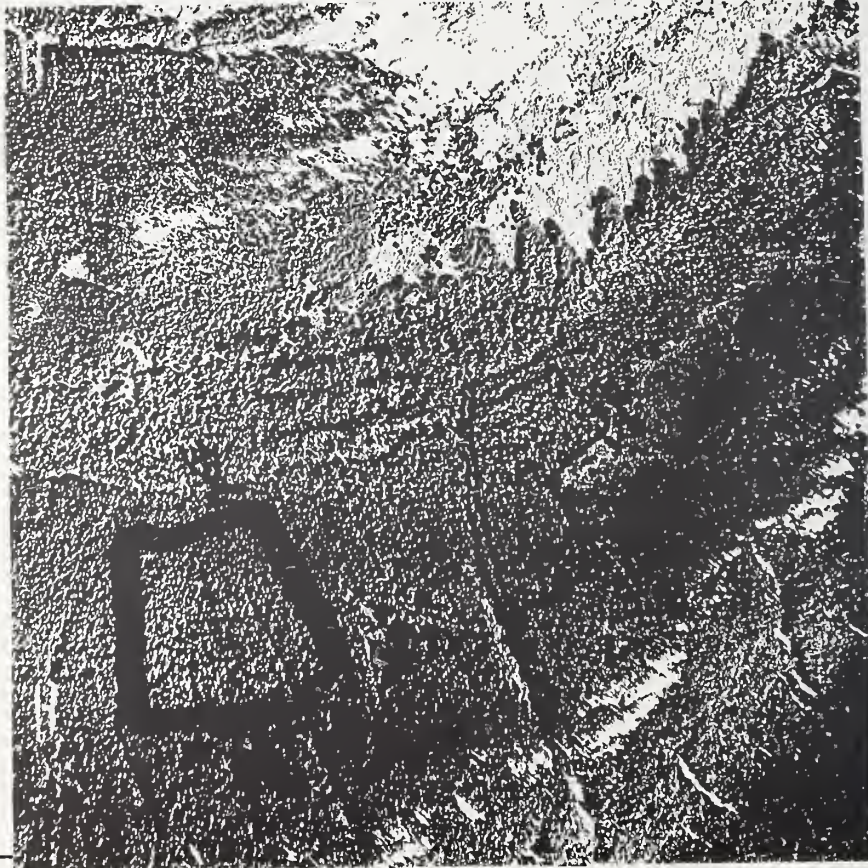
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT # <u>54</u>	ACRES <u>55</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>1251</u>	VOLUME CRUISE <u> </u>	<u> </u>
SALE NAME <u>AA 06</u>	<u> </u>		
PHOTO LINE AND NUMBER <u> </u>	<u> </u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: <u>Close out to a rest following natural regrowth. Ave. site index (Fav) is 85 but the average is 70-90. Retain an average of 2 average per acre for diversity.</u></p>			
SOILS		HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u>Multiple settings required to yard away from V-notch to avoid soil disturbance and slice & sediment delivery to unworked unit modification needed to avoid results of monitoring high hazard soil. - Ret 9/89</u>	
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>Discourage traffic flow to road closed</u>	
FISHERIES / HYDROLOGY		CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u> FHMU <u>III</u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>	
OBJECTIVE / PRESCRIPTION: <u>Follow soils prescription to split yard class III channel. A1 channel type</u>		9/89 SLP	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES <u>No</u> UNIT NOT IN EMPHASIS	
OBJECTIVE / PRESCRIPTION: <u>Species habitat. Mgmt. should favor timber mgmt. objectives. Manage entire drainage for maximum diversity. Retain 2 snags & down logs per acre as practice. Vehicle access should be managed to minimize wildlife disturbance</u>			
VISUAL RECREATION		SEE ATTACHED	
Assigned VQO = <u>No.1</u>		units to assigned	
CULTURAL		KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u>	
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: <u>HL Split yard unit 2 settings yard away from creek.</u>	
REMARKS		<u>Recruitment, 300 attached</u>	

PLANNED (ORTHO PHOTO) SCALE:

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>64</u>	ACRES <u>80</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2302</u>	VOLUME CRUISE <u>320</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>37</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clear cut followed by natural regeneration. Two no more than 10' to high side with an average of 9/16" diameter trees at age 10 with a timber emphasis. Retain an average of 2 snags per acre for diversity.</p>			
SOILS		HIGH HAZARD AREA	
<p>AD soils concerned idls 1, 2, and 14 photo review 1/10 1/11</p>		OBJECTIVE / PRESCRIPTION:	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD OPEN ROAD	
Discourage Traffic		Allow to Grow Closed	
FISHERIES / HYDROLOGY		CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING	
OBJECTIVE / PRESCRIPTION:		FHMU TEMPERATURE SENSITIVITY: YES NO	
NO CONCERNS IDENTIFIED		SIP 9/69	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES	
Should be managed to meet timber production objectives. Manage this drainage to produce optimum diversity of age, structure and species vegetation. 8/11		NO This unit contains No emphasis species habitat. It	
RECREATION		OBJECTIVE / PRESCRIPTION:	
SEE ATTACHED		Assigned VQO Mod. unit plots assigned	
CULTURAL		KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM	
OBJECTIVE / PRESCRIPTION:		OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: Corbin's Yard, One end suspension through "V" notches	
REMARKS		Recreation: See attached	



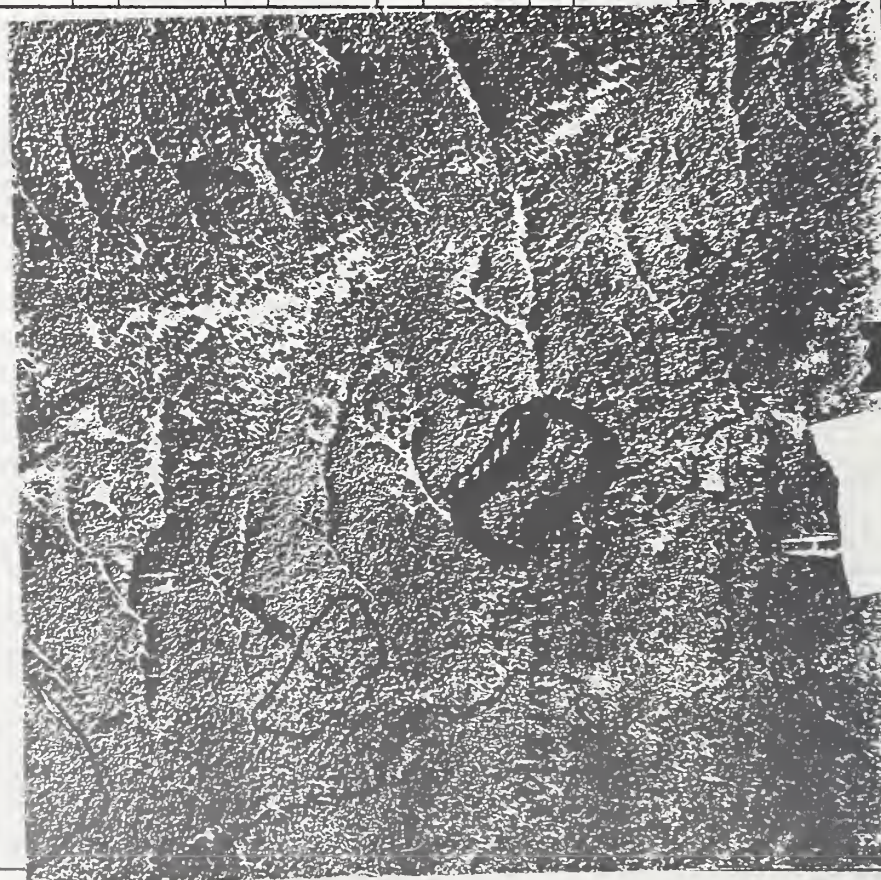
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT # <u>65</u>	ACRES <u>20</u>	LOGGING SYSTEM <u>L/L</u>
STAND # <u>—</u>	VOLUME FEIS <u>648</u>	VOLUME CRUISE <u>—</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>36</u>			
OBJECTIVES <u>100</u>			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This is a high site area (site is over 100 feet). Monitor regeneration and pre-commercial thinning at 12-18 yrs of age with a timber expansion. Retain an average of 2 snags per acre for diversity. Consider intermediate span and picking up scattered snags above planned thickening.</p>			
SILVICULTURE		HIGH HAZARD AREA	
SOILS		OBJECTIVE / PRESCRIPTION:	
<p>No Apparent soils concerns during photo review 9/89</p>			
RESULTS OF MONITORING			
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:	
<p>Keep open for General Traffic</p>			
FISHERIES / HYDROLOGY		CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —	
OBJECTIVE / PRESCRIPTION:		FHMU — TEMPERATURE SENSITIVITY: YES — NO —	
<p>NO CONCERNS IDENTIFIED 8/29/89</p>			
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> This unit does	
<p>species habitat but is located in a previously unlogged drainage. Manage this unit for habitat diversity. Retention of 2 snags & down logs will help protect wildlife habitat value.</p>		OBJECTIVE / PRESCRIPTION: —	
RECREATION		SEE ATTACHED	
Assigned VGO-PR		unit does not meet assigned	
CULTURAL		KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —	
OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: High lead yard no specific on cars	
REMARKS		Recreation: Secluded	



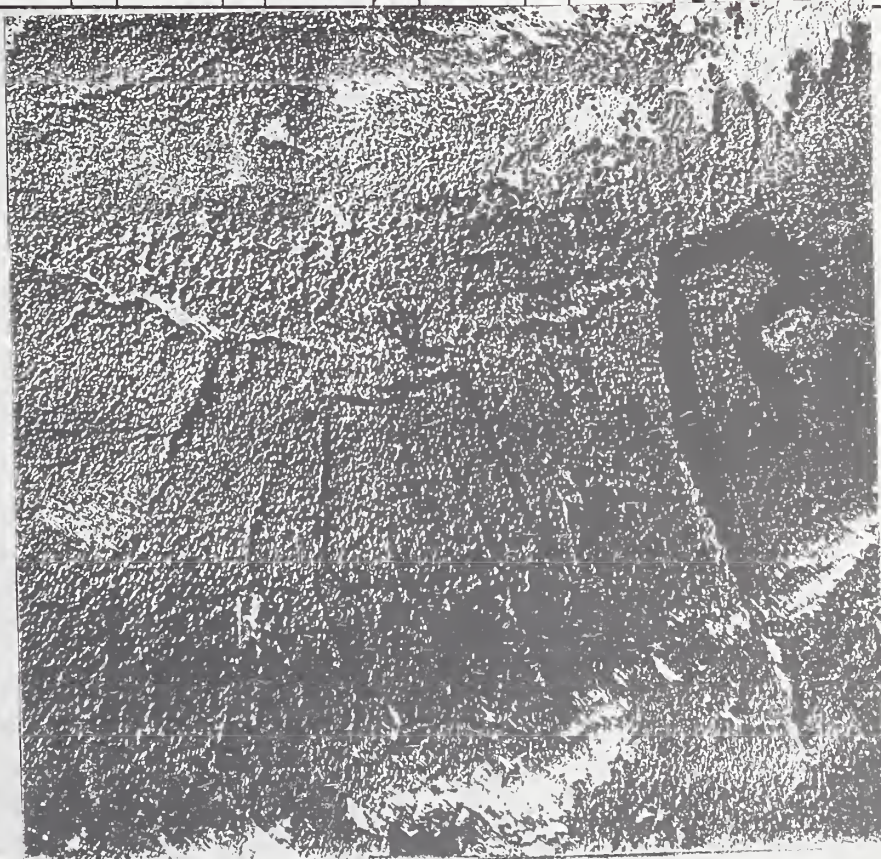
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT # <u>66</u>	ACRES <u>15</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA</u>	VOLUME FEIS <u>D6</u>	VOLUME CRUISE <u>486</u>	
SALE NAME <u>AA D6</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES			
<p>SILVICULTURE</p> <p>OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. This is a highly productive ADO unit on average site (under 92 (Fam). Precommercially thin at age 12-18 yrs. with a thinning prescription. Retain an average of 2 snags per acre.</p>			
<p>SOILS</p> <p>HIGH HAZARD AREA <input checked="" type="checkbox"/> OBJECTIVE / PRESCRIPTION: Extreme hazard soils on backline. drop backline below 70% slope. Add on timber volume in flat. 220% slopes may need shovel yarding for monitoring. 7/89 RWD</p>			
<p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: keep open for General Traffic</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —</p> <p>FHMU I TEMPERATURE SENSITIVITY: YES — NO <input checked="" type="checkbox"/></p> <p>OBJECTIVE / PRESCRIPTION: MAINTAIN MINIMUM 100' BUFFER ALONG CLASS I channels. Disturbed riparian inst. (see photo) 7/89 SPP</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES</p> <p>OBJECTIVE / PRESCRIPTION: This unit is a good size considering its location. see Attached. 15 acres riparian</p>			
<p>VISUAL RECREATION</p> <p>OBJECTIVE / PRESCRIPTION: SEE ATTACHED</p>			
<p>CULTURAL</p> <p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: H/lead yard Fall and yard away from stream buffer zone.</p>			
<p>REMARKS</p> <p>Recreation: see Attached</p>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u> EIS UNIT # <u>67</u> ACRES <u>50</u> LOGGING SYSTEM <u>HL</u>		OBJECTIVE / PRESCRIPTION: <u>Clearcut followed by natural regeneration. Site index 90 (Fam). Prescribed thin at age 12-18 with timber emphasis. Retain an av. of 2 snags per ac. for diversity.</u>	
STAND #	VOLUME FEIS	VOLUME CRUISE	
SALE NAME <u>AA 06</u>	<u>1171</u>		
PHOTO LINE AND NUMBER	<u>37</u>	<u>320</u>	
OBJECTIVES		HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>No soils concerns id'd in photo revised R.W. 9/89</u>	
PLANNED (ORTHO PHOTO)		RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE: <u>Discourage Traffic allow to grow closed</u>	
SCALE: _____		FISHERIES / HYDROLOGY CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMUTL TEMPERATURE SENSITIVITY: YES _____ NO _____ OBJECTIVE / PRESCRIPTION: <u>MAINTAIN CLASS III INTEGRITY. Keep unit boundary above V-notch slope break. A1 channel type. SEP 9/89.</u>	
		WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> OBJECTIVE / PRESCRIPTION: <u>See Attached.</u>	
		VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>	
		CULTURAL Assigned VCO Mod. unit meets assigned KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:	
		LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>HL yard, fell and yard away from class 3 stream</u>	
		REMARKS <u>Recreation: See Attached</u>	



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU 235 EIS UNIT # 68 ACRES 30 LOGGING SYSTEM HL
 STAND # AA VOLUME FEIS 912 VOLUME CRUISE 06
 SALE NAME AA
 PHOTO LINE AND NUMBER

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE:



SILVICULTURE

OBJECTIVE / PRESCRIPTION: Recreation in alluvial flat near the creek. (See attached)
Regeneration in the upper 1/2 of the unit. This is a high fire
(Fire 05). Site is appropriate for forest planting on slopes 20%.
Refine an over 1/2 acre for a new forest. (See attached)
Reforestation and pick-up up isolated timber above planned backline

SOILS

OBJECTIVE / PRESCRIPTION: NO apparent soils concerns in
photo review. Soils may be requested for
review with backline at layout 2/2/89

ROAD LOCATION AND OBJECTIVE

RESULTS OF MONITORING: discretion. 2/2/89
 CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION:
Keep open for General Traffic

FISHERIES / HYDROLOGY

CLASS I CROSSING NO CLASS II CROSSING NO CLASS III CROSSING NO
 FHMU 2 TEMPERATURE SENSITIVITY: YES NO
 OBJECTIVE / PRESCRIPTION: Directionally fall timber away from buffer
MAINTAIN MINIMUM 100 BARREN ACRES
ADJACENT CLASS I STREAM TO PROTECT
FISH HABITAT 2/2/89 SEP

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES YES
 OBJECTIVE / PRESCRIPTION:

See attached
30 acres riparian

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION: SEE ATTACHED

CULTURAL

Assigned VGO: PR unit does not need assigned
 KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: H, lead yard no specific
concerns.

REMARKS

Recreation; See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT # <u>70</u>	ACRES <u>45</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>1183</u>	VOLUME FEIS <u>AA 06</u>	VOLUME CRUISE <u>37</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>318</u>		
OBJECTIVES This is a highly productive site (average of 4000 s.k. in day 90).			
SILVICULTURE of map unit 5234. Lower slopes appropriate for short yarding (slopes < 20%). This appears to be a highly active area. Silvicultural needs to be in volume selection. System may be necessary. Retain an average of two upper layers.		OBJECTIVE / PRESCRIPTION: <u>Additional regeneration (Sitka Spruce) on lower slopes</u>	
SOILS HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION:		ROAD LOCATION AND OBJECTIVE CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: <u>Keep open for General traffic</u>	
FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS IDENTIFIED.</u>		CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING FHMU TEMPERATURE SENSITIVITY: YES NO IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> 45 acres riparian OBJECTIVE / PRESCRIPTION:	
WILDLIFE Manage for habitat diversity of the entire drainage by scheduling harvest in 5-10 entries over a 10 year period. See Attached.		VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>	
CULTURAL ASSIGNED VQO = PR and does not assigned		KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>High lead yard no specific concerns.</u>		REMARKS <u>See attached</u>	

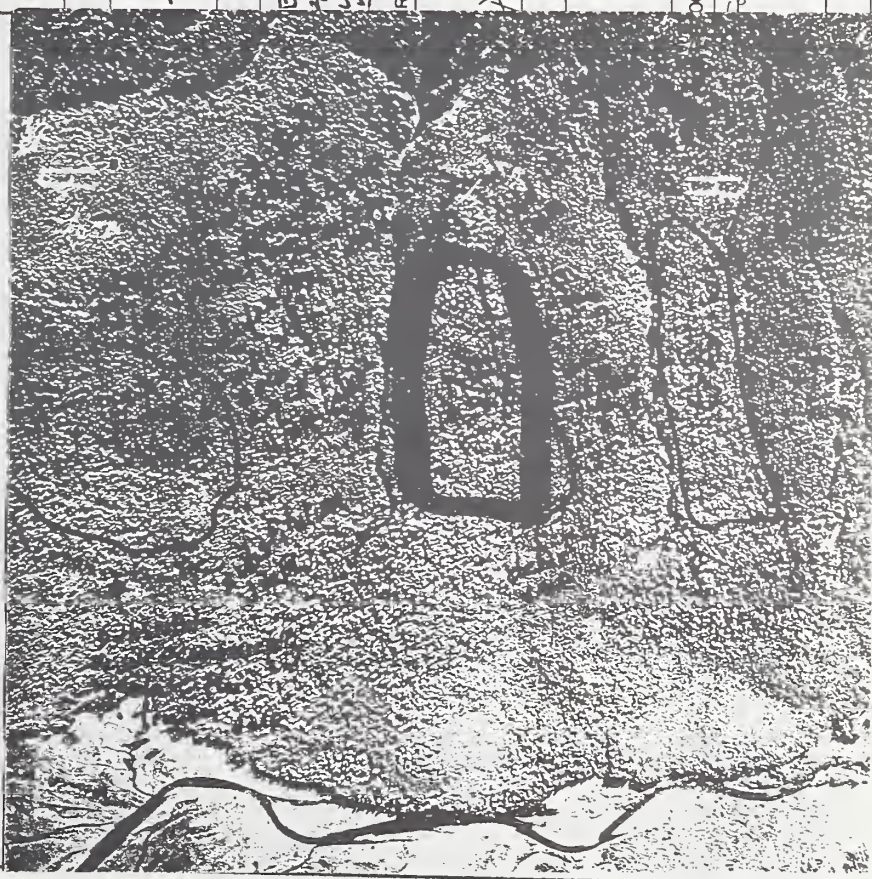


81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

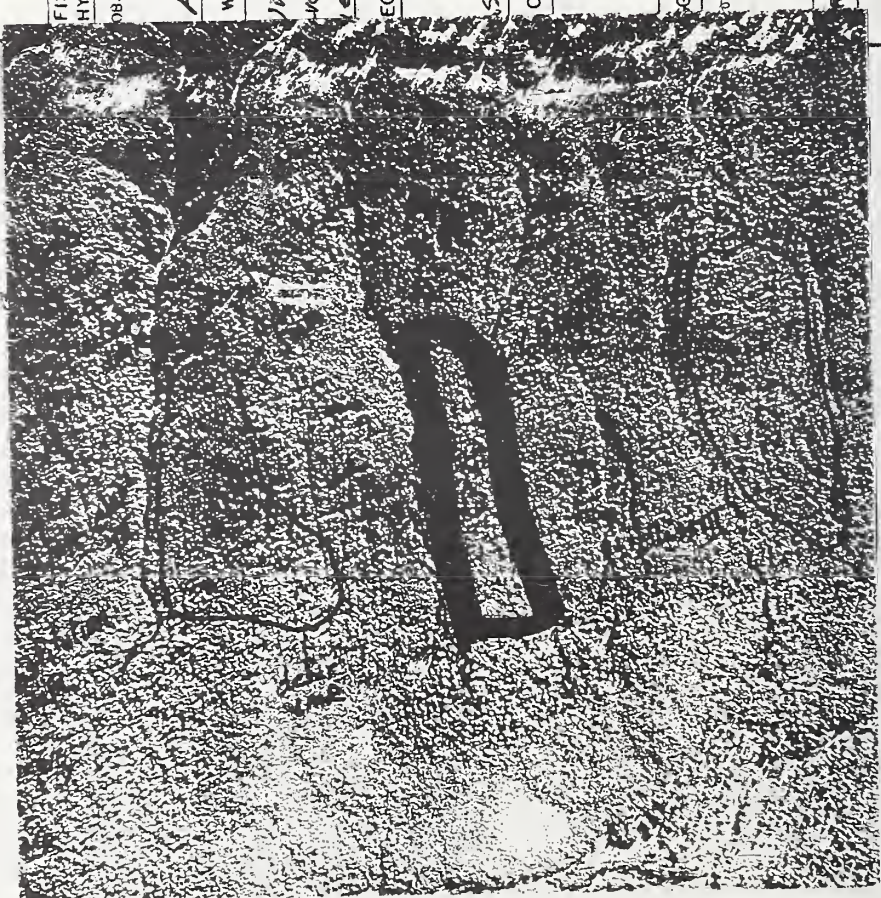
VQU <u>235</u>	EIS UNIT # <u>71</u>	ACRES <u>61</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA06</u>	VOLUME FEIS <u>1538</u>	VOLUME CRUISE <u>310</u>	
SALE NAME <u>AA06</u>	PHOTO LINE AND NUMBER <u>35 B</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. The unit is a mix of medium to high productivity with a majority of 97 to 100. Average is 93 (Fair). Monitor vegetation and riparian regeneration. Harvest at age 12-18 with a wildlife emphasis. Retain the 80,000 of 2 acre for diversity. Success depends on even site timber on south boundary and following riparian wet boundary. Also appears to be a possible riparian cutting (see photo).</p> <p>HIGH HAZARD AREA <u>SA.</u></p> <p>OBJECTIVE / PRESCRIPTION:</p>			
RESULTS OF MONITORING			
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>Keep open for General traffic</u>	
FISHERIES / HYDROLOGY	CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u>	FPMU <u> </u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>	
OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS IDENTIFIED. SEE 9/69</u>			
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u>		
see Attached			
VISUAL RECREATION	61 acres DWR & 61 acres old Growth		
OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>			
CULTURAL	Assigned VQO: PR and does not meet assigned		
KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u>			
OBJECTIVE / PRESCRIPTION			
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>High as No specific concerns</u>		
REMARKS	<u>Recreation: See Attached</u>		

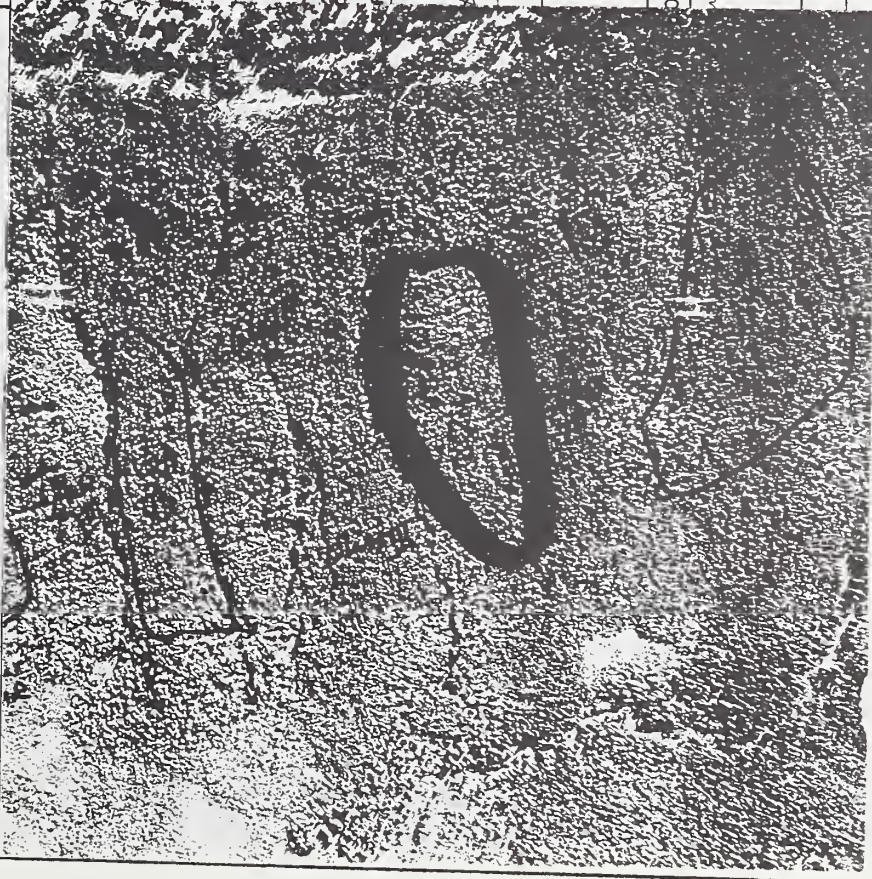


81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

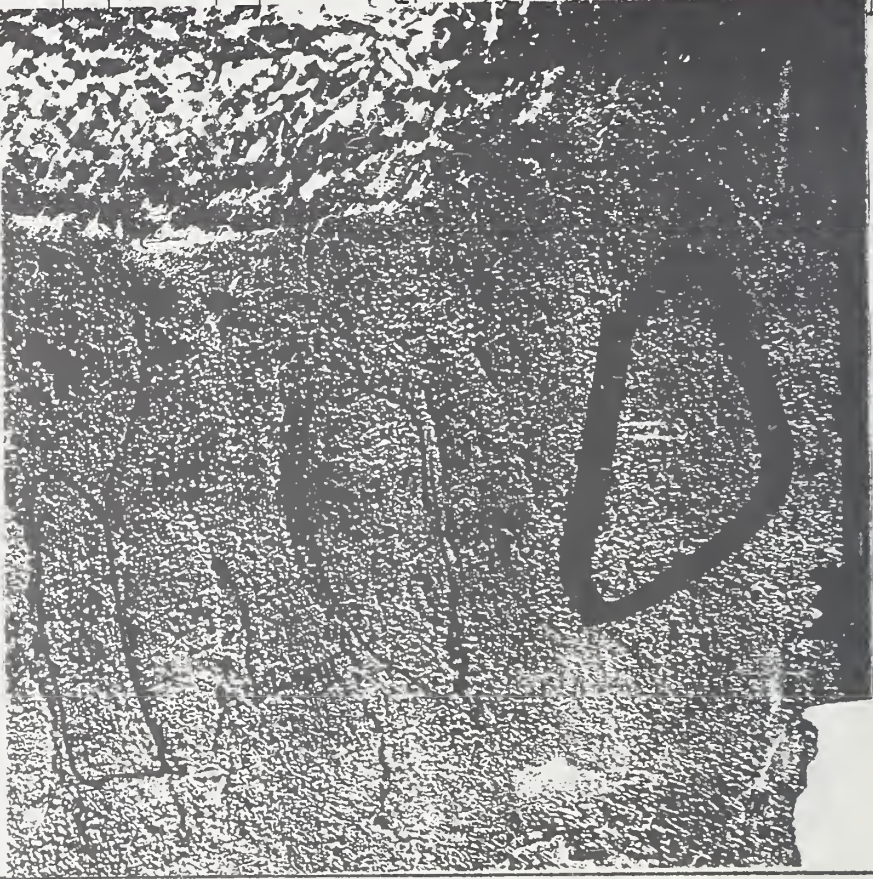
VOU <u>235</u> EIS UNIT <u>72</u> ACRES <u>53</u> LOGGING SYSTEM <u>14</u> STAND # <u> </u> VOLUME FEIS <u>1328</u> VOLUME CRUISE <u> </u> SALE NAME <u>AA06</u> PHOTO LINE AND NUMBER <u>36 B 310</u>		SILVICULTURE OBJECTIVE / PRESCRIPTION: <u>Cleared harvest site and regenerate. This is a high production site (see Part 12.8 with a wildlife emphasis. Return 20% of area to forest diversity. South boundary).</u>	
OBJECTIVES		SOILS HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u>S.A.</u>	
PLANNED (ORTHO PHOTO) SCALE: <u> </u>		RESULTS OF MONITORING ROAD LOCATION AND OBJECTIVE CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>Keep open for General traffic</u>	
		FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: <u>maintain CLASS III channel integrity.</u> CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u>1</u> FHMU <u>III</u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>	
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>Yes 53ac. DWR, 53ac. Old growth</u> OBJECTIVE / PRESCRIPTION <u>See Attached</u> Best unit size in deer winter Range is less than 40 acres with an average of 10 acres. Provide a wind firm corridor of old growth timber every 1/4 mile to allow access to beach fringe in winter.		VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u> Assigned VQO = PR and does not meet assigned	
CULTURAL KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u>		LOGGING SYSTEM OBJECTIVE / PRESCRIPTION <u>Downhill slackline one setting 1500ft tall and yard away from class one stream</u>	
REMARKS: <u>Recruitment, see attached</u>			

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

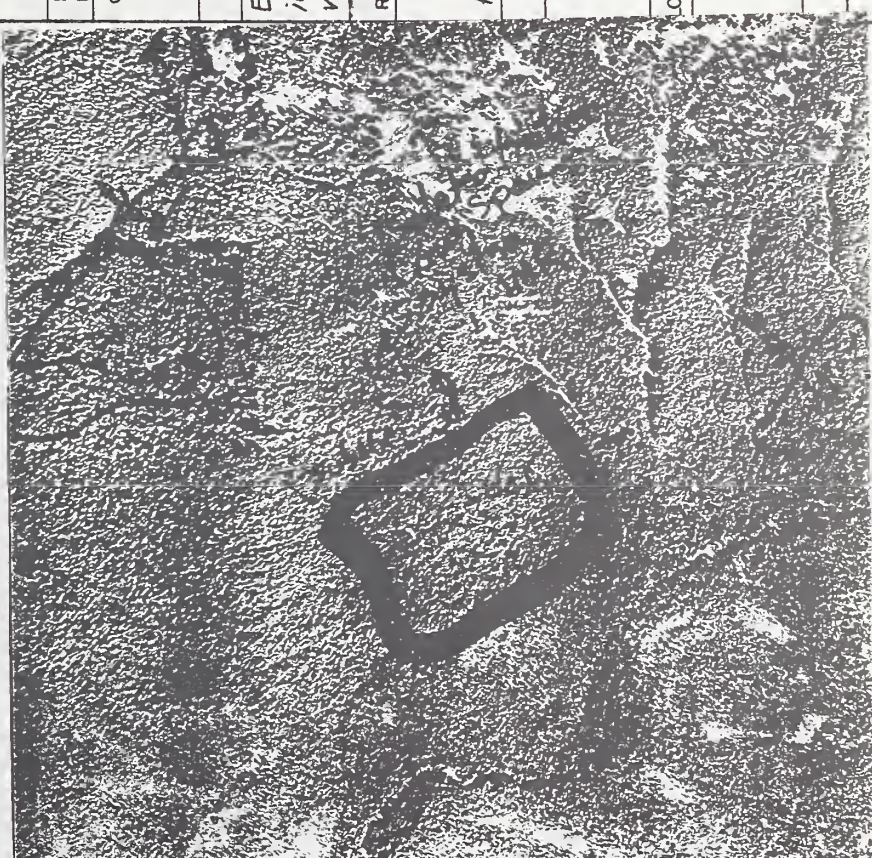
VCU <u>235</u> EIS UNIT <u>73</u> ACRES <u>41</u> LOGGING SYSTEM <u>PL</u> STAND # <u>AA 06</u> VOLUME FEIS <u>1006</u> VOLUME CRUISE <u>310</u> SALE NAME <u>AA 06</u> PHOTO LINE AND NUMBER <u>35B</u>		OBJECTIVE / PRESCRIPTION: <u>Clear cut harvest to restore riparian zone. This is a highly productive site. Pres. 5.599. Retain riparian and floodplain areas. This is a riparian area with a wildlife emphasis. Retain an average of 20% riparian forest.</u>	
OBJECTIVES		HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u>with its layered out clearing</u> <u>PLW 9/89</u>	
SOILS		RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>keep open for General traffic</u>	
PLANNED (ORTHO PHOTO)		SCALE: <u> </u>	
		FISHERIES / HYDROLOGY CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u>2</u> FHMU III TEMPERATURE SENSITIVITY: YES <u> </u> NO <u>X</u> OBJECTIVE / PRESCRIPTION: <u>maintain class III water quality.</u>	
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>YES</u> <u>41ac. Old Growth</u> OBJECTIVE / PRESCRIPTION: <u>See Attached. 41ac. DWE</u> <u>Unit size good. Plan logging. Winter range</u> <u>areas to be logged in 5-10 entries over a 100</u> <u>year period. Provide wind firm old growth strip every 4 mi.</u>		VISUAL CREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>	
CULTURAL KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u>assigned VQO - PR unit does not need assigned</u>		LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>Down hill slackline, one setting 1900-2000 ft, Fall and yard away from creek</u>	
REMARKS		<u>Recreation: See attached</u>	

VCU <u>235</u> EIS UNIT <u>74</u> ACRES <u>61</u> LOGGING SYSTEM <u>EL</u>	
STAND # <u> </u> VOLUME FEIS <u>1379</u> VOLUME CRUISE <u> </u>	
SALE NAME <u>AA06</u>	
PHOTO LINE AND NUMBER <u>35B</u> <u>310</u>	
OBJECTIVES	
PLANNED (ORTHO PHOTO)  SCALE: <u> </u>	
SILVICULTURE	OBJECTIVE / PRESCRIPTION: <u>Site productivity, stands from low to high (from site 61-100). The average site is about 80. Monitor regeneration and productivity at age 12-18 with a wildlife emphasis. Retain an average of 2 snags per acre.</u>
SOILS	HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u>no soils concern identified in photo review 9/89</u>
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>keep open for general traffic</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u>2</u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u>X</u> OBJECTIVE / PRESCRIPTION <u>maintain class III water quality.</u>
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> <u>blac. old growth</u> OBJECTIVE / PRESCRIPTION <u>See attached blac. DWR</u> <u>Provide windfirm old growth strips every 1/4 mile.</u> <u>Units should not be over 40 acres with an average size 10 acres.</u>
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>
CULTURAL	KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u>Assigned VAO = PR unit does not need assigned</u>
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Down hill Slack line</u> <u>One setting 1500-2000 ft</u> <u>away from "v" notches.</u> <u>Fall and yard</u>
REMARKS	<u>Recreation: See Attached</u>

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

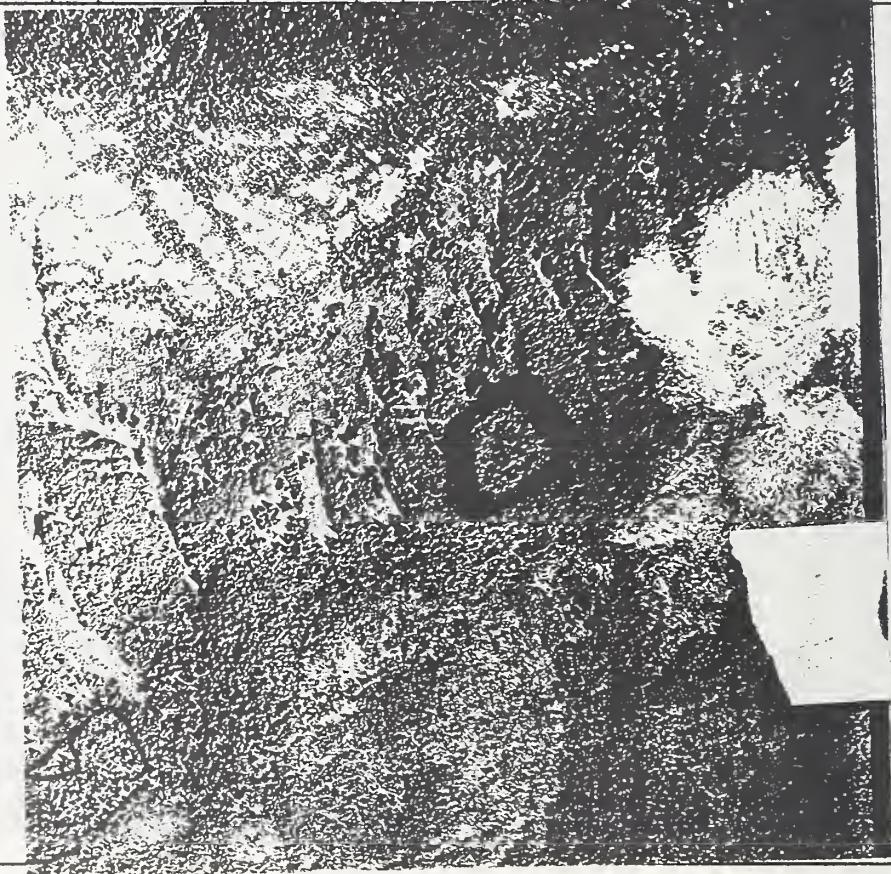
VCU <u>235</u> EIS UNIT <u>75</u> ACRES <u>88</u> LOGGING SYSTEM <u>#1</u> STAND <u>2341</u> VOLUME FEIS <u>2341</u> VOLUME CRUISE _____ SALE NAME <u>AA 06</u> PHOTO LINE AND NUMBER <u>35B</u> <u>310</u>		SILVICULTURE OBJECTIVE / PRESCRIPTION: <i>Revegetation. This is a 12 year low productivity to moderate (low 60-80). Average site index is 78. Silviculture: no regeneration and commercial slash at age 12-15 years. With a wildlife emphasis. Retain the bulkage of 2 species per acre for diversity.</i>	
OBJECTIVES HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____ SOILS <u>no soils concerns</u> <i>Rev 7/89</i>		RESULTS OF MONITORING ROAD LOCATION AND OBJECTIVE CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: <u>keep open for General traffic</u>	
PLANNED (ORTHO PHOTO) 		FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: _____ CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHW _____ TEMPERATURE SENSITIVITY: YES _____ NO _____ <u>NO CONCERNS IDENTIFIED.</u>	
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> OBJECTIVE / PRESCRIPTION: _____ <u>See Attached</u> <u>88 acres old Growth</u>		VISUAL RECREATION OBJECTIVE / PRESCRIPTION: _____ <u>SEE ATTACHED</u> <u>Assigned VQO=PR unit does not meet assigned</u>	
CULTURAL KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION: _____		LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>Down hill slack line</u> <u>1500-1800 ft.</u>	
REMARKS <u>Recreation: see attached.</u>			

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u> EIS UNIT # <u>77</u> ACRES <u>97</u> LOGGING SYSTEM <u>HL</u>		SILVICULTURE		OBJECTIVE / PRESCRIPTION: (Carcut harvest followed by natural regeneration. Site productivity ranges from 84-100 FAV).	
STAND # <u>AA 06</u> VOLUME FEIS <u>2524</u> VOLUME CRUISE <u>100</u>		SOILS		Average site index is 90. Monitor regeneration and periodically thin at 12-18 yrs. of age with a timber explanation. Return an average of 2-3 bags per acre. Consider adding timber to backline with long spin system to avoid economically isolating timber.	
SALE NAME <u>AA 06</u> PHOTO LINE AND NUMBER <u>36</u>		HIGH HAZARD AREA		OBJECTIVE / PRESCRIPTION:	
OBJECTIVES		potentially over steepened slopes.		Soils request review of backline during unit layout. RW 2/89	
PLANNED (ORTHO PHOTO)		ROAD LOCATION AND OBJECTIVE		CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: Keep spur for General traffic	
SCALE: <u> </u>		FISHERIES / HYDROLOGY		CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u> FHMU <u> </u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>	
		OBJECTIVE / PRESCRIPTION:		NO CONCERNS Soil 710f	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES		Yes see attached	
Eastern 1/4 of unit lies in Riparian Habitat. Leave snags in small clumps near the bottom of the unit near riparian habitat.		OBJECTIVE / PRESCRIPTION:		SEE ATTACHED	
VISUAL RECREATION		KNOWN SITE		PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u>	
Assigned VPO = PR unit does not meet assignment		CULTURAL		OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: Hilead yard no specific concerns			
REMARKS		Recreation: see attached			

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>104</u>	ACRES <u>40</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA</u>	VOLUME FEIS <u>1238</u>	VOLUME CRUISE <u>37</u>	
SALE NAME <u>AA</u>	<u>06</u>	<u>318</u>	
PHOTO LINE AND NUMBER			
OBJECTIVES			
<p>SILVICULTURE</p> <p>OBJECTIVE / PRESCRIPTION: Big and heavy forested in natural regeneration this of high to low productivity from Fan site 61 to 100. Average site index of 80. Retain an average of 2500 sq ft per acre for diversity. Consider intermediate Span to avoid isolating trunks at backline</p>			
<p>SOILS</p> <p>HIGH HAZARD AREA</p> <p>OBJECTIVE / PRESCRIPTION: Split yard capital V-notch to maintain soil stability RW 7/89</p>			
RESULTS OF MONITORING:			
<p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: Keep open for General traffic</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —</p> <p>FHMU — TEMPERATURE SENSITIVITY: YES — NO —</p> <p>OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED 5/11/89</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES Yes See Attached.</p> <p>OBJECTIVE / PRESCRIPTION: 10 acres riparian Lower 1/4 of unit is in Riparian habitat. Avoid isolating timber along the backline to prevent future disturbance of this area again to get the isolated volume.</p>			
<p>VISUAL RECREATION</p> <p>OBJECTIVE / PRESCRIPTION: SEE ATTACHED unit doesn't need assigned Assigned VQO = PR</p>			
<p>CULTURAL</p> <p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: Grubstakes yard, with one end suspension through "V" notches.</p>			
<p>REMARKS</p> <p>Recreation: See attached</p>			

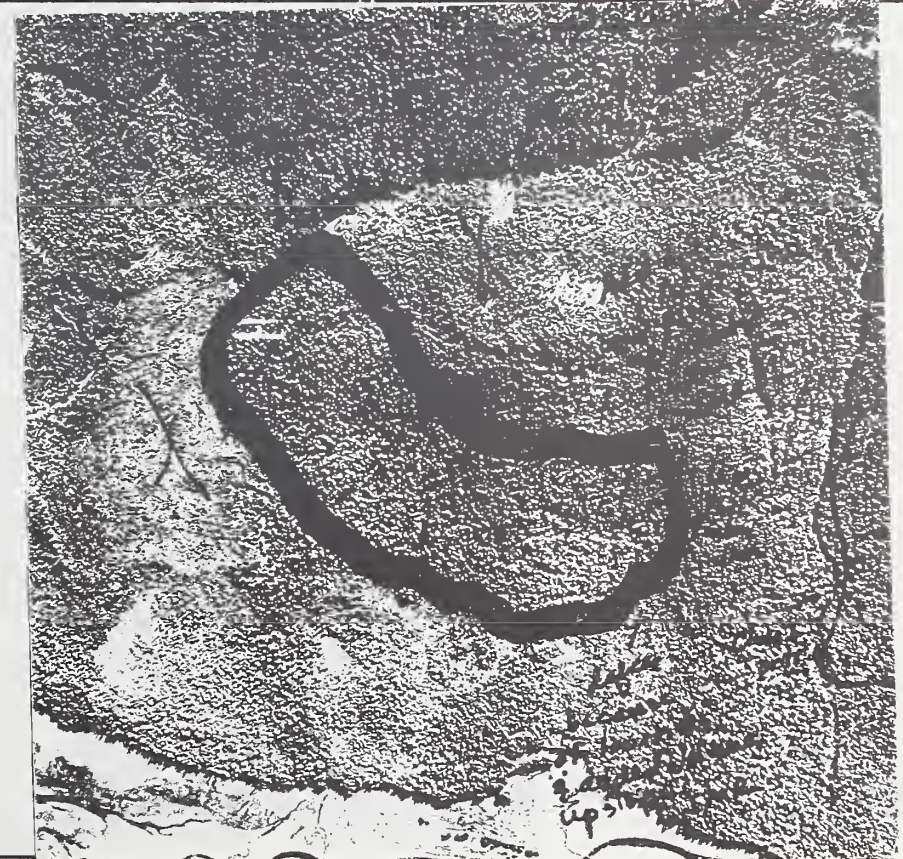


81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>*235</u>	ACRES <u>170</u>	LOGGING SYSTEM <u>HL</u>
STAND <u>*</u>	VOLUME FEIS <u>3854</u>	VOLUME CRUISE <u>311</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>35B</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clear cut harvest followed by natural regeneration. This area is medium to light chert (Fossils in the 87-100) with an average 93. Unit is adjacent to a previous forested area which was established as a wildlife refuge. Suggest adding timber on landscape to prevent isolating timber. Retain an average of 2 acres per acre for diversity.</p>			
<p>SOILS</p> <p>maintain backline below 75% slopes to reduce landslide risk</p>			
<p>RESULTS OF MONITORING:</p> <p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: Keep open for General Traffic</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —</p> <p>FHMU — TEMPERATURE SENSITIVITY: YES — NO —</p> <p>OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES — YES See Attached.</p> <p>OBJECTIVE / PRESCRIPTION: Unit is adjacent to an existing large clearcut which provides good escape cover and forage. Best unit size in deer winter range is 40 acres or less with an average of 10 acres. 170 ac. DWR & 170 ac. old growth.</p>			
<p>VISUAL RECREATION</p> <p>OBJECTIVE / PRESCRIPTION: SEE ATTACHED</p> <p>Unit is located in assigned VQO of PR. Unit meets Max. Mtd VQO due to larger size and proximity to other large units. Reduce size considerably (at least 50%) to reduce number of units in drainage to meet designed VQO.</p>			
<p>CULTURAL</p> <p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: H: lead no specific concerns</p>			
<p>REMARKS</p> <p>Recreation, 3000 ft. etc.</p>			

PLANNED (ORTHO PHOTO)

SCALE:




SILVICULTURE

OBJECTIVE / PRESCRIPTION: *Site and harvest fell more ≥ 10 years ago.*
This unit is ~~one~~ a high-quality productive site. Favor 125-1000 units on a 10% of 97.

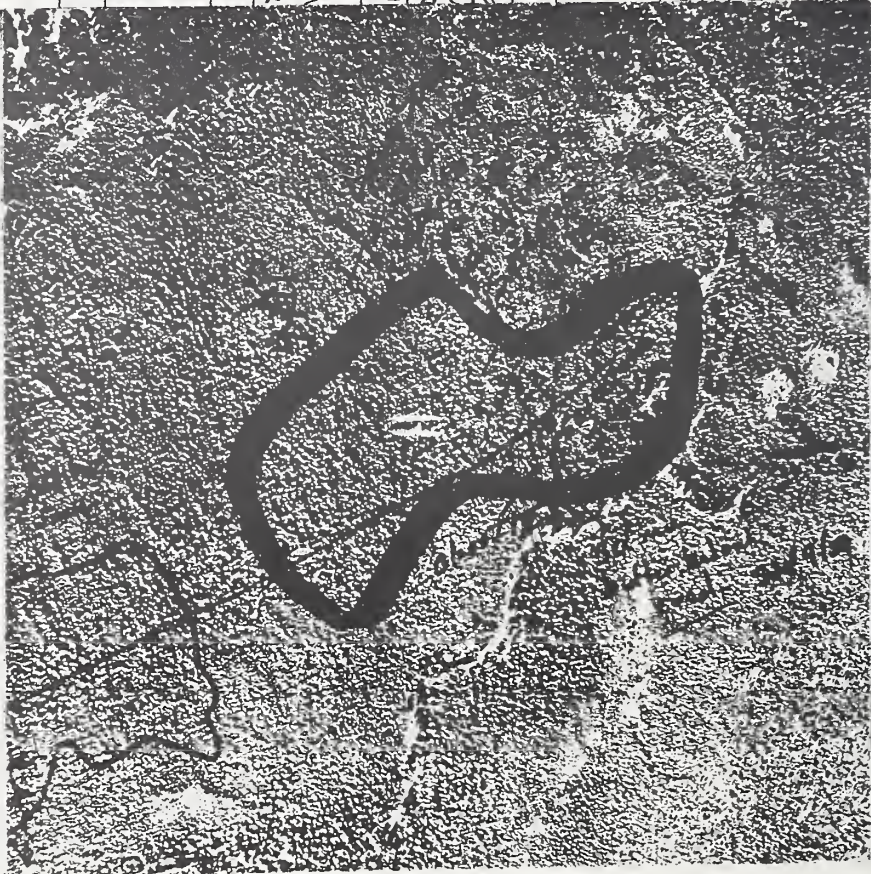
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81-00 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU <u>235</u>	EIS UNIT <u>*237</u>	ACRES <u>130</u>	LOGGING SYSTEM <u>ITL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2875</u>	VOLUME CRUISE <u>35B</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>35B 309</u>			
OBJECTIVES			
			
PLANNED [ORTHO PHOTO] _____ SCALE: _____			
RESULTS OF MONITORING: ROAD LOCATION _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: <u>Keep open for General Traffic</u>			
SOILS _____ HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>Split yard from V-unit to maintain stability RW 9/89</u>			
SILVICULTURE _____ OBJECTIVE / PRESCRIPTION: <u>Chesnut forest followed by natural regeneration. This unit ranges from moderate to high productivity (from 80-100). Average site index is 95. Moderate site index and 10-12% premature decay. Thin with a wild life emphasis. Retain an average of 20% per acre. Consider moving back trees along east edge right unit. May span back into avoid isolation for unit. Stand thinning overgrowth.</u>			
FISHERIES / HYDROLOGY _____ CLASS I CROSSING _____ CLASS II CROSSING <u>1</u> CLASS III CROSSING _____ FHMU <u>III</u> TEMPERATURE SENSITIVITY: YES _____ NO <u>X</u> OBJECTIVE / PRESCRIPTION: <u>Maintain Water Quality in Class III stream</u>			
WILDLIFE _____ IN HABITAT FOR OLD GROWTH SPECIES <u>YES</u> SEE ATTACHED. OBJECTIVE / PRESCRIPTION: <u>A1 channel type SW 9/89</u>			
VISUAL RECREATION _____ OBJECTIVE / PRESCRIPTION: <u>Unit is located in assigned VQO of PR. Unit meets view. Mod. VQO due to large size and proximity to other large units. Reduce size considerably (at least 50%) & reduce number of units in drainage to meet assigned VQO. SEE ATTACHED</u>			
CULTURAL _____ KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION: _____			
LOGGING SYSTEM _____ OBJECTIVE / PRESCRIPTION: <u>Hillside yard, split setting on either side of creek, yard away from creek</u>			
REMARKS _____			

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>*238</u>	ACRES <u>165</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>4534</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>35B 309</u>			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Use area as a sedimentation on adjacent area (Floods). Consider this unit as a trail or as a road for logging. Substitution of volume on East edge of unit (long span). Substitution also reduces amount of isolated timber along backline. This is a volume to higher production site (Class 80-90). Average size under 90. Monitor regeneration and precommercially thin at age 12-18 years with a wildlife emphasis. Retain an average of 2500ggs per acre for diversity.</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
		<p>no soils concerns RW 7/89</p>	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
			Keep open for General traffic
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FMU <input checked="" type="checkbox"/> TEMPERATURE SENSITIVITY: YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>		
OBJECTIVE / PRESCRIPTION:	<p>Maintain Class III water quality. Maintain habitat capability in Class I channel segment. A1 channel type 548 9/89</p>		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES	Yes See attached	
	OBJECTIVE / PRESCRIPTION:	<p>The southern most portion of the unit lies within riparian habitat. 20 acres riparian</p>	
VISUAL RECREATION	<p>OBJECTIVE / PRESCRIPTION: Unit is located in assigned VQO of PR. Unit meets Max. Mod. VQO due to large size and proximity to other large units. Reduce size considerably (at least 50%) & reduce number of units in drainage to meet assigned VQO. SEE ATTACHED</p>		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH	MEDIUM
	OBJECTIVE / PRESCRIPTION:		
LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: Head yard split setting along creek, Fell and yard away from creek. Protect buffer along River fell and yard away from buffer</p>		
REMARKS	<p>Recruitment See Attached</p>		



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>*239</u>	ACRES <u>142</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>—</u>	VOLUME FEIS <u>3853</u>	VOLUME CRUISE <u>—</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>36 101</u>			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Site productivity ranges from 84-100 (fair). Average site index is 93. Monitor, adjust rotation and prescription annually from age 11-18 and a timber crop plan. Retain an average of 2 snags per acre for diversity.</p>			
<p>HIGH HAZARD AREA <u>—</u> OBJECTIVE / PRESCRIPTION:</p>			
<p>RESULTS OF MONITORING:</p>			
<p>ROAD LOCATION AND OBJECTIVE: CLOSED ROAD <u>—</u> OPEN ROAD <u>—</u> OBJECTIVE / PRESCRIPTION: MAIN RD Remains open for General traffic LOCAL Road Sides of Lookout will be allowed to grow closed naturally</p>			
<p>FISHERIES / HYDROLOGY: CLASS I CROSSING <u>—</u> CLASS II CROSSING <u>—</u> CLASS III CROSSING <u>—</u> FHMU <u>—</u> TEMPERATURE SENSITIVITY: YES <u>—</u> NO <u>—</u> OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED. 7/81 SUP</p>			
<p>WILDLIFE: IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> see Attached. OBJECTIVE / PRESCRIPTION: The northern tip of this Unit extends into riparian habitat. The unit boundary configuration somewhat mitigated its large size. 5 acres riparian</p>			
<p>VISUAL RECREATION: OBJECTIVE / PRESCRIPTION: Unit is located in assigned VQO of PR. Unit meets max. mod. VQO due to large size and proximity to other large units. Reduce size considerably (at least 50%) & reduce number of units in drainage to meet assigned VQO. SEE ATTACHED</p>			
<p>CULTURAL: KNOWN SITE <u>—</u> PROBABILITY ZONE: HIGH <u>—</u> MEDIUM <u>—</u> OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM: CONCERNS OBJECTIVE / PRESCRIPTION: Hilead yard no specific</p>			
<p>REMARKS: Recreation: See Attached</p>			

PLANNED (ORTHO PHOTO)

SCALE: —



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT <u>*240</u>	ACRES <u>65</u>	LOGGING SYSTEM <u>H/L</u>
STAND <u>*</u>	VOLUME FEIS <u>1654</u>	VOLUME CRUISE <u>100</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>36</u>			
OBJECTIVES			
<p>AVOID soil disturbance & consequent sediment production. However flat may meet shovel yard spindles and if 50 shovel results of MONITORING be shovel yarded to avoid soil disturbance.</p> <p>Split yard away from Unit to avoid soil disturbance & consequent sediment production.</p> <p>Keep open for General traffic</p>			
<p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:</p>			
<p>SILVICULTURE</p> <p>OBJECTIVE / PRESCRIPTION: Unit is located in assigned VQO of PR. Unit meets mix. Mod. VQO due to large size and proximity to other large units in drainage. Reduce size of units considerably (at least 50%) & reduce number of units in drainage to meet assigned VQO. SEE ATTACHED</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —</p> <p>FHMI <u>I</u> TEMPERATURE SENSITIVITY: YES <u>NO</u></p> <p>OBJECTIVE / PRESCRIPTION: <u>Directly over timber away from buffer</u></p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> See Attached</p> <p>OBJECTIVE / PRESCRIPTION: Manage for Habitat diversity. Avoid leaving isolated timber above this unit unless it is impossible to reach. Once reproduction has reached 5 feet tall do not disturb again. Each unit per rotation period except to thin.</p>			
<p>CULTURAL</p> <p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: H/lead yard split setting on either side of stream. Yards away from stream. Protect Buffer along River fall and yard away from Buffer</p>			
<p>REMARKS</p> <p>Recreation: See attached</p>			



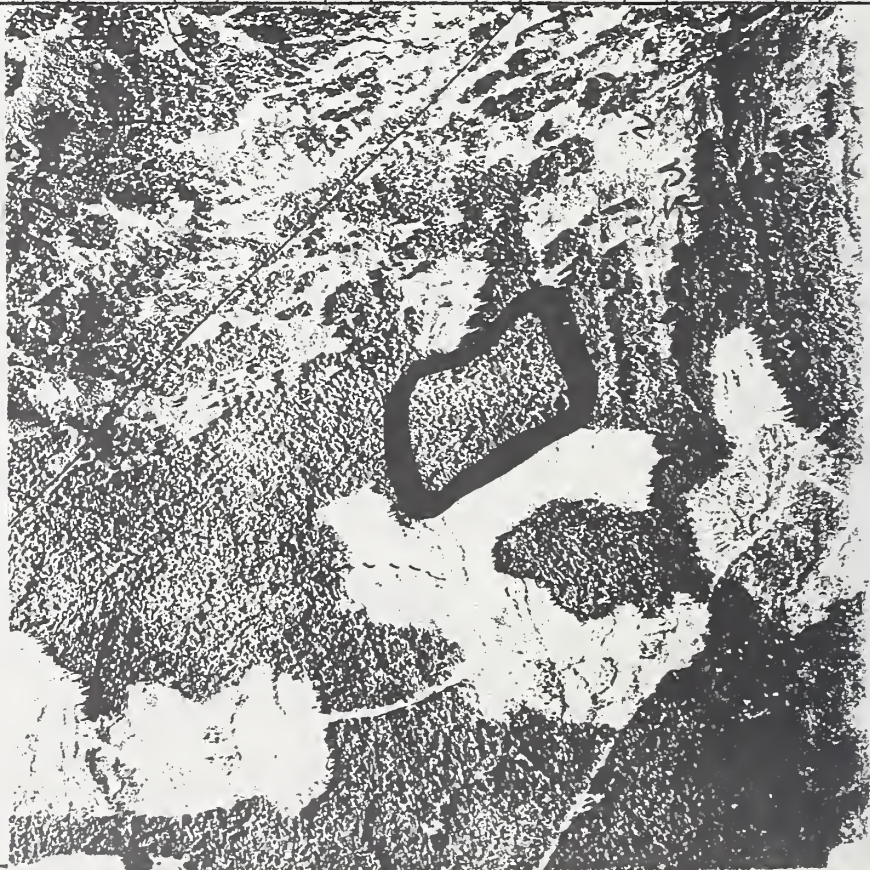
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>235</u>	EIS UNIT # <u>241</u>	ACRES <u>140</u>	LOGGING SYSTEM <u>LL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>4347</u>	VOLUME CRUISE <u>100</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>36</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut followed by artificial regeneration (Site Spruce). Stand growing to appropriate in soil and unit 5234B on slopes $\leq 20\%$. This unit is in a moderate to high productivity area (Fair site index 83-100). Average site index is 90. Retain an average of 2 snags per acre for diversity. Isolated timber on backline use different system.</p>			
<p>HIGH HAZARD AREA <input checked="" type="checkbox"/> OBJECTIVE / PRESCRIPTION: backline occupies Extreme areas wasting byard soils, drop backline 100' as indicated on photo. Add on at lower unit. $\leq 20\%$ slopes at backline. MONITORING: meet shovel yard exit via RW 94</p>			
<p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: Keep open for Ground timber</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING <input checked="" type="checkbox"/> CLASS II CROSSING — CLASS III CROSSING <input checked="" type="checkbox"/></p> <p>AMU I TEMPERATURE SENSITIVITY: YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/></p> <p>OBJECTIVE / PRESCRIPTION: MAINTAIN HABITAT CAPABILITY IN CLASS I stream & stream in class III channels. 519/69. PROTECT WATER QUALITY IN CLASS III channels.</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES YES See Attached.</p> <p>OBJECTIVE / PRESCRIPTION: Manage for habitat diversity of the entire drainage over one rotation period. Avoid leaving isolated timber because this stand may be damaged & disturbed while logging isolated volume. 140ac. riparian of PR. Unit meets Max. Mod. VQO due to large size and proximity to other large units in drainage. Reduce size of unit considerably (at least 50%) & reduce number of units in drainage to meet assigned VQO. SEE ATTACHED</p>			
<p>CULTURAL</p> <p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: High lead yard split settings fall and yard away from streams. Protect after a long river fall and yard away from buffer</p>			
<p>REMARKS</p> <p>Recreation: See attached</p>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>236</u>	EIS UNIT # <u>31</u>	ACRES <u>50</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA06</u>	VOLUME FEIS <u>1330</u>	VOLUME CRUISE <u>117</u>	
SALE NAME <u>AA06</u>	PHOTO LINE AND NUMBER <u>3813</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: <u>Clearcut harvest to be made by vintage 1990. This area has low productivity (Forestry index 60). This harvest unit is adjacent to stand 56 which was harvested in 1974 and certified as regenerative in 1979. Return an average of 2 shags per acre for diversity.</u></p>			
SILVICULTURE	<p>OBJECTIVE / PRESCRIPTION: <u>Clearcut harvest to be made by vintage 1990. This area has low productivity (Forestry index 60). This harvest unit is adjacent to stand 56 which was harvested in 1974 and certified as regenerative in 1979. Return an average of 2 shags per acre for diversity.</u></p>		
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
<p>RESULTS OF MONITORING:</p>			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION
			<u>Discourage traffic allow to sunscise</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FMU	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION:	<u>NO CONCERNS IDENTIFIED</u>		
	<u>SVR 9/89</u>		
WILDLIFE	<p>IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u></p> <p>OBJECTIVE / PRESCRIPTION: <u>This unit is not located within emphasis species habitat. This unit should be managed for timber production. The intensity of past harvest in this drainage is a concern for habitat diversity. Young growth in the clearcut below should be protected.</u></p>		
RECREATION	<p>MEETS UPO MODIFICATION AS PLANNED</p> <p>ASSIGNED</p>		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH	MEDIUM
	OBJECTIVE / PRESCRIPTION:		
LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: <u>Grubinski yard with one end suspended to minimize impact to sensitive soils.</u></p>		
REMARKS	<p>RRZ 9/15/89</p> <p>Recreation: See attached</p>		



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOLUME 236 EIS UNIT *32 ACRES 68 LOGGING SYSTEM HL
STAND *1088 VOLUME FEIS 1088 VOLUME, CRUISE _____
SALE NAME AA 06
PHOTO LINE AND NUMBER _____

OBJECTIVES

SILVICULTURE

Unit 32 is adjacent to stands 202 and 93. Stand 202 was blowdown and salvaged in 1980. Unit 32 is not yet 5' tall. Stand 93 was harvested in 1975 and certified as regenerated in 1986. Regeneration is not yet 5' tall. Monitor the regeneration to unit 32 and preserve it with a timber management plan when the stand is 12-18 yrs. of age. Retain and manage the area for biodiversity.

SOILS

HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: SEE ATTACHED

RESULTS OF MONITORING

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Put a will Black Rd Put Drainage Mainline keep open to General traffic

FISHERIES / HYDROLOGY

OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED SEP 1/89

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES NO GNL
OBJECTIVE / PRESCRIPTION: This area does not need to be managed for emphasis species habitat. Because of the intensity of past harvest in this area and its history of blow down habitat diversity is a concern for non-emphasis species and dispersion between units should be maintained.

VISUAL RECREATION

ASSIGNED
MEETS VPO MODIFICATION AS PLANNED
SEE ATTACHED

CULTURAL

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Hill road yard No specific concerns

REMARKS

Recreation: See attached



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 236 EIS UNIT # 34 ACRES 53 LOGGING SYSTEM LS
 STAND # AA 06 VOLUME FEIS 1410 VOLUME CRUISE 69
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 39B

SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Overseed harvest for 1944 unit by unit and regenerate this in a final production unit. The unit is adjacent to stand 144 which was cut in 1946 and is planted in 1946 or 1947. Monitor regeneration and at 12-18 years remove all thin and CA timber emphasis. Retain an average of 2 snags per acre for diversity.

OBJECTIVES
 SEE ATTACHED
 oversteepened slopes

SOILS
 HIGH HAZARD AREA SEE ATTACHED
 OBJECTIVE / PRESCRIPTION:

PLANNED (ORTHO PHOTO)
 SCALE: 1" = 100'

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD OPEN ROAD Block Pull Drainage (SPUR)
 (Main line) keep open for General traffic



FISHERIES / HYDROLOGY
 CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
 FHMU III TEMPERATURE SENSITIVITY: YES NO
 OBJECTIVE / PRESCRIPTION:
MAINTAIN CHANNEL INTENSITY IN CLASS III STREAM.
A1 channel types

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO This unit contains NO be managed for timber production. Stand 144 now provides good forage and escape cover for wildlife. Young growth in stand 144 should be protected while logging unit 34. Retain 2 snags and down logs per acre where possible.

RECREATION
 OBJECTIVE / PRESCRIPTION: SEE ATTACHED
MEPS ASSIGNED 190 MODIFICATION AS PLANNED

CULTURAL
 KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Down hill stack (i.e. full suspension across old unit to protect plantation.

REMARKS
Recreation: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 236 EIS UNIT 38 ACRES 88 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 1620 VOLUME, CRUISE 104
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 36

OBJECTIVES _____
 PLANNED (ORTHO PHOTO) _____
 SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Decomposition followed by natural regeneration. Site index (final) is mostly 1st
Return an average of 2 snags per acre

SOILS
 HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____
Soils along backline road should remain for wildlife management
Soil scattered to various in 1 buffer
 RESULTS OF MONITORING: _____
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: _____
Discourage traffic allow to some closed

FISHERIES / HYDROLOGY
 CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHMU ☒ TEMPERATURE SENSITIVITY: YES _____ NO ☒
 OBJECTIVE / PRESCRIPTION: Maintain Class I stream capability. Questionably full away from buffer
SP 9/69

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO This unit contains NO OBJECTIVE / PRESCRIPTION: emphasis species habitat. It should be managed for timber production. As practice and safe, retain 2 snags and/or standing culls per acre. Down cull logs in various stages of decomposition should not be logged. Avoid leaving isolated timber above units which will be logged
 VISUAL RECREATION
AS PLANNED
MEETS UPO MODIFICATION AS PLANNED

CULTURAL
 KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION: _____

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Hilead Yard, Feltland Yard away from creek.

REMARKS
Recreation! See Attached

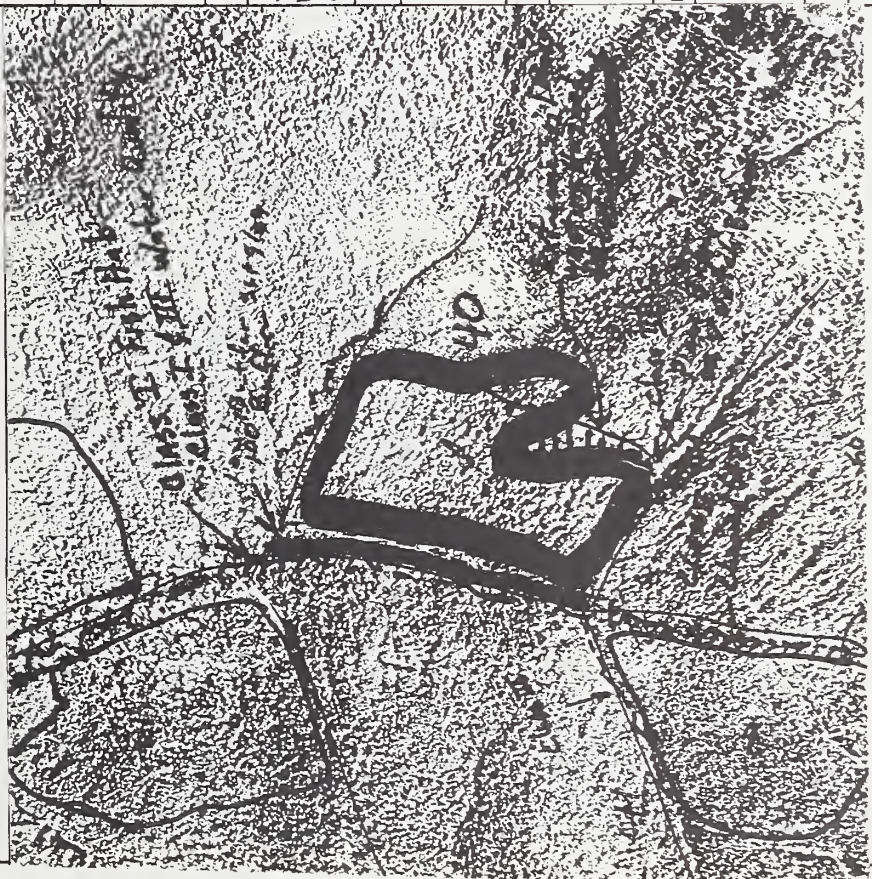
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOLUME	236	EIS UNIT	39	ACRES	95	LOGGING SYSTEM	HL
STAND		VOLUME FEIS	1520	VOLUME CRUISE			
SALE NAME	AA 06						
PHOTO LINE AND NUMBER	36						104
<p>OBJECTIVES</p> <p>This unit should be skyline logged to east side of Muri Cr. This would make it feasible to reach the substituted timber. Also leaves less isolated timber</p>							
<p>PLANNED (ORTHO PHOTO)</p> <p>SCALE:</p>							
SILVICULTURE		OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. This is a riparian, productive site (Fam 82). Exclude area of young growth (four-year-old) timber on Northeast corner of unit. Add additional timber at backhoe. Retain an average of 2 snags per acre for diversity.					
SOILS		HIGH HAZARD AREA: NO 50% conc. 3					
RESULTS OF MONITORING:		ROAD LOCATION AND OBJECTIVE: CLOSED ROAD: OPEN ROAD: DISCOVERY TRAIL: MOUNTAIN CROSSING					
FISHERIES / HYDROLOGY		CLASS I CROSSING: CLASS II CROSSING: CLASS III CROSSING: FHMU I TEMPERATURE SENSITIVITY: YES NO					
OBJECTIVE / PRESCRIPTION:		and water quality in Class I channel B3 channel type. Directionally fall away from buffer					
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES: NO This unit contains no objective / prescription: emphasis species habitat. It should be managed for timber production. As practice & safe, retain 2 snags and/or standing snags per acre. Down call logs in various stages of decomposition should not be yarded. Do not leave isolated timber above units to be logged on a 200' entry. Close or manage objective / prescription: road access to this area.					
VISUAL RECREATION		ASSIGNED MEETS VGO MODIFICATION AS PLANNED SEE ATTACHED					
CULTURAL		KNOWN SITE: PROBABILITY ZONE: HIGH MEDIUM					
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: Hi lead yard 1200ft potential for skyline from east side of Muri creek would be 2000' plus full suspension across buffer strip on creek.					
REMARKS		Mutation: See attached					

MSJ

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU	236	EIS UNIT	40	ACRES	98	LOGGING SYSTEM	HL
STAND #		VOLUME FEIS	2439	VOLUME	CRUISE		
SALE NAME	AA	06					
PHOTO LINE AND NUMBER		36			104		
OBJECTIVES							
PLANNED (ORTHO PHOTO)							
SCALE:							



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut leaves followed by natural regeneration. Site productivity ranges from 79 and 80 on the gentler slopes to 95 on the steeper drained slopes. Average is 90. Monitor the region and precommercially thin at age 12-18 years with timber emphasis. Retain an average of 2 snags per acre.		
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
in S.E. upper boundary of unit. Expose soil mass wasting beyond.			
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
	Discourage Traffic	Allow to grow closed	
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FHMU	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION:	maintain Class I fish habitat and Class I/II water quality. SVP 7/89		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES NO This unit contains no old growth species. This is species habitat. It should be managed for timber production. As practiced safe, retain 2 snags and/or standing culls per acre. Down cull logs in various stages of decomposition, should not be yarded. Avoid leaving isolated timber above unit which will be logged in a 2nd entry.		
RECREATION	NEEDS ASSIGNED VPO MODIFICATION AS PLANNED SEE ATTACHED		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH	MEDIUM
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: High yield no specific concerns		
REMARKS	Recreation - See attached		

1000

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

material

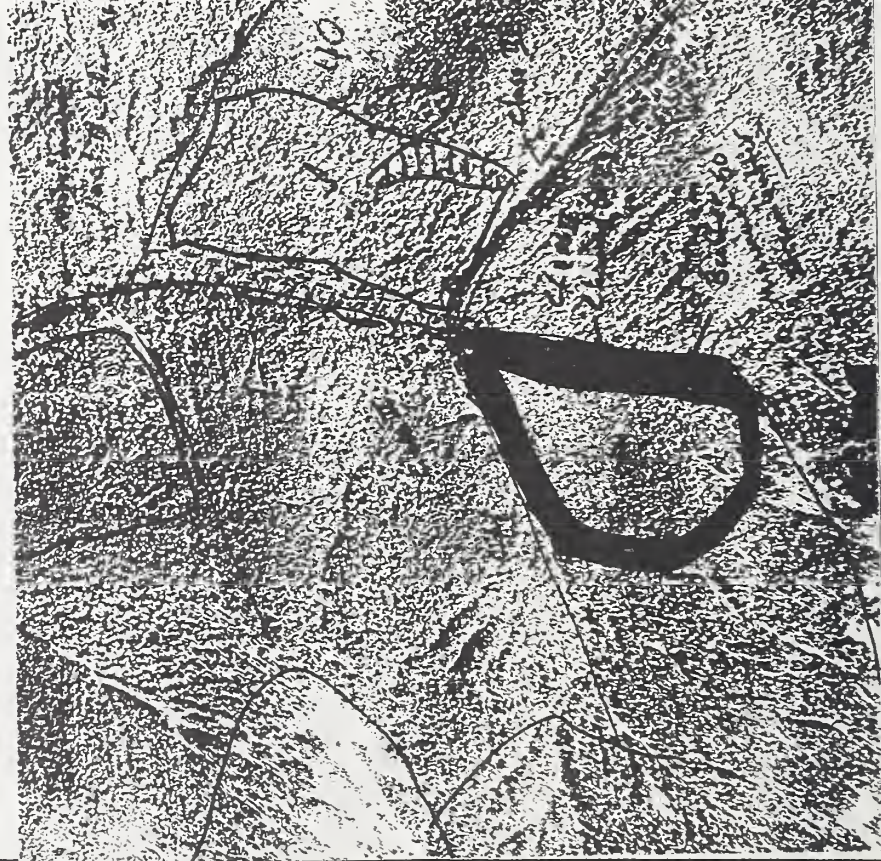
VOLUME FEIS 1007
 VOLUME FEIS 1007
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 36
 LOGGING SYSTEM HL
 LOGGING SYSTEM HL
 VOLUME, CRUISE
 104

SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut has not followed by silviculture material
 Thin w 40 degree etc. an equal amount of (Pine).
 Return an average of 2 snags per acre for diversity.

SOILS
 HIGH HAZARD AREA
 OBJECTIVE / PRESCRIPTION:
 No apparent hazards in photo
 Review, possibly oversteepened slopes in
 East corner may need soils field review

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD
 OPEN ROAD
 OBJECTIVE / PRESCRIPTION:
 Discourage Traffic Allow to grow closed

PLANNED (ORTHO PHOTO)
 SCALE:



FISHERIES / HYDROLOGY
 CLASS I CROSSING
 CLASS II CROSSING
 CLASS III CROSSING
 TEMPERATURE SENSITIVITY: YES NO X

OBJECTIVE / PRESCRIPTION:
 and Class III stem water quality 9/8950
 Directionally fall away from buffer

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES
 OBJECTIVE / PRESCRIPTION: No This unit contains no
 should be managed for timber production. As practice safe,
 retain 2 snags and/or standing culls per acre. Down cull logs,
 in various stages of decomposition, should not be yarded. Do
 not leave isolated timber above units to be logged with a 200

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: entry.

MEETS ASSIGNED UGO MODIFICATION AS PLANNED

SEE ATTACHED

CULTURAL
 KNOWN SITE
 PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: H: lead yard no specific
 concern.

REMARKS
 Revision: See Attached

Volume 4 Acres changed in Tables
81-90 SEIS UNIT LAYOUT AND ROAD

LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>236</u>	EIS UNIT # <u>44</u>	ACRES <u>5076</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA</u>	VOLUME FEIS <u>1118</u>	VOLUME CRUISE <u>323</u>	
SALE NAME <u>AA</u>	06		
PHOTO LINE AND NUMBER <u>37</u>			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Site productivity is variable within this unit depending on site index from 55 to 80. (Average is 75). Retain an average of 2 snags per acre for diversity.</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
	NO soils concerns	NO 9/89	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
		DISCONVEY TRAILER ALLOW TO GROW CLOSED	
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
OBJECTIVE / PRESCRIPTION:	FHMI	TEMPERATURE SENSITIVITY: YES	NO
NO CONCERNS IDENTIFIED 5/11 9/89			
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES		
	OBJECTIVE / PRESCRIPTION: WITHIN EMPHASIS SPECIES HABITAT. Timber production should be emphasized here. As practice & safe, retain 2 snags and/or standing culls per acre. Down cull 100% in various stages of decomposition should not be yarded. Road access to this side of the drainage should be restricted if not needed for timber mgmt.		
RECREATION	MEETS ASSIGNED UPO MODIFICATION AS PLANNED		
	SEE ATTACHED		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH	MEDIUM
	OBJECTIVE / PRESCRIPTION:		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Portions of the unit appear suitable for shoel yarding. High lead yard the rest of the unit. Uphill yarding.		
	RRZ 9/15/89		
REMARKS	Recreation: See Attached		



650

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU 236 EIS UNIT 47 ACRES 35 LOGGING SYSTEM HL
 STAND # VOLUME FEIS 931 VOLUME CRUISE
 SALE NAME AA06
 PHOTO LINE AND NUMBER

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE:



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This area is a highly productive site (Farr SE91). Unit 47 is adjacent to stands 199 and 200 which were harvested in 1978. Unit 199 was planted and certified as regenerated in 1986. It is not 5' tall. Stand 200 was certified as regenerated in 1983. Monitor the regeneration and preservation of thin at age 12-18 yrs with a timber emphasis. Retain an average snag for diversity.

SOILS
 NO soils concerns identified using photo survey 9/89

RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION:

FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION: NO CONCERNS
 CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
 FHMU TEMPERATURE SENSITIVITY: YES NO

WILDLIFE
 OBJECTIVE / PRESCRIPTION: IDENTIFIED SVN 9/89
 IN HABITAT FOR OLD GROWTH SPECIES NO (See attached)
 OBJECTIVE / PRESCRIPTION: Good unit size to provide for habitat diversity. Unit is adjacent to a clear cut logged in 1978. Cover in this adjacent to a clear cut is tall enough to provide escape cover and good forage values.

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION:

CULTURAL
 KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Hiked No specific concerns

REMARKS
Regeneration: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>236</u>	EIS UNIT # <u>49</u>	ACRES <u>43</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA06</u>	VOLUME FEIS <u>1144</u>	VOLUME CRUISE <u> </u>	
SALE NAME <u>AA06</u>			
PHOTO LINE AND NUMBER <u> </u>			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This area is a highly productive site (Farr 91). It is adjacent to Stand 200 which was harvested in 1978 and cut-piled as regenerated in 1983. Monitor the regeneration and precommercially thin at age 12-18 yrs. with a timber emphasis. Retain an average of 2500 ft² per acre for deer habitat.</p>			
HIGH HAZARD AREA			
OBJECTIVE / PRESCRIPTION:			
<p>NO soils concerns plant. find downy photo review 9/29</p>			
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE			
CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION:			
FISHERIES / HYDROLOGY			
CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u>			
FHMU <u> </u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>			
OBJECTIVE / PRESCRIPTION:			
<p>NO CONCERNS IDENTIFIED</p>			
WILDLIFE			
IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (See attached)			
OBJECTIVE / PRESCRIPTION: Good unit size in nonemphasis species habitat. Unit is adjacent to a clearcut logged in 1978. Cover in this adjacent unit is tall enough to provide escape cover and good forage values.			
VISUAL RECREATION			
OBJECTIVE / PRESCRIPTION:			
CULTURAL			
KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u>			
OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM			
<p>Head No specific concerns</p>			
REMARKS			
<p>Recreation: see attached</p>			

PLANNED (ORTHO PHOTO)

SCALE:



4147 only

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 237	EIS UNIT # 2	ACRES 47	LOGGING SYSTEM HL
STAND #	VOLUME EIS 1091	VOLUME CRUISE	
SALE NAME AA 06			
PHOTO LINE AND NUMBER 41	176-267	7-23-76	

OBJECTIVES	<p>next shovel yard criteria: shovel yard 17 lack of deflection.</p>
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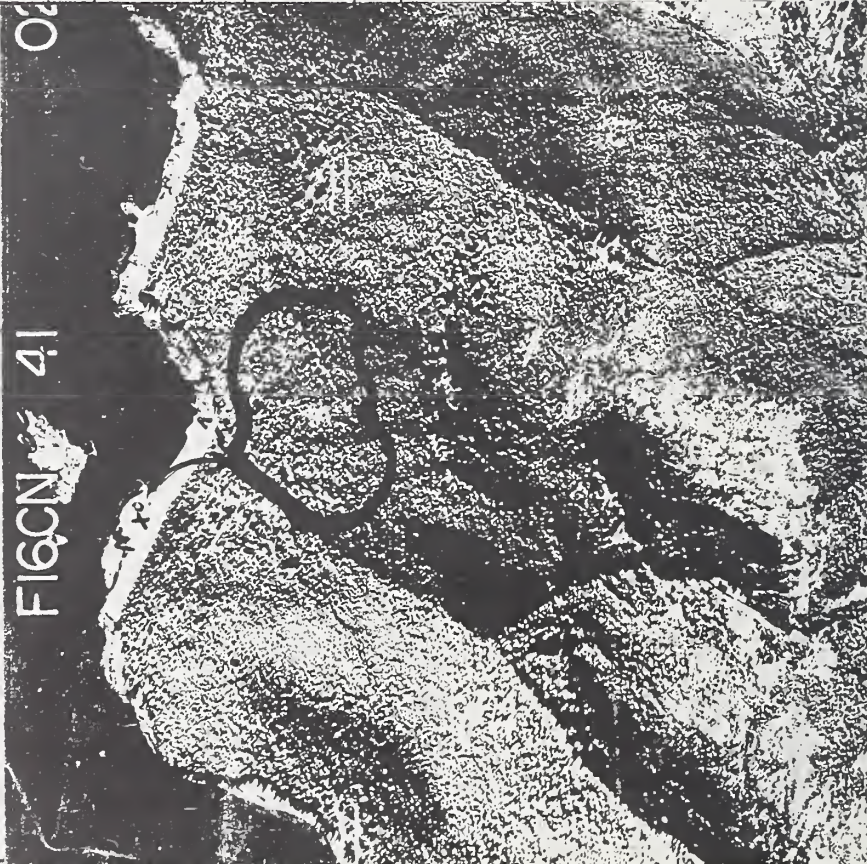
ROAD LOCATION AND OBJECTIVE	<p>ROAD LOCATION: OPEN ROAD — OBJECTIVE / PRESCRIPTION: Keep open for General Traffic</p>
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FISHERIES / HYDROLOGY	<p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING — FHWY — TEMPERATURE SENSITIVITY: YES — NO —</p>
OBJECTIVE / PRESCRIPTION	<p>NO CONCERNS IDENTIFIED 8/89 SIA</p>

WILDLIFE	<p>IN HABITAT FOR OLD GROWTH SPECIES NO See attached. OBJECTIVE / PRESCRIPTION</p>
OBJECTIVE / PRESCRIPTION	<p>Unit is adjacent to riparian habitat in Trap Bay area.</p>

VISUAL RECREATION	<p>OBJECTIVE / PRESCRIPTION: LA INPUT DURING LAYOUT PERT TO UNIT MEETS ASSIGNED VQO MODIFICATION. SEE ATTACHED</p>
CULTURAL	<p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM — OBJECTIVE / PRESCRIPTION</p>

LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: The majority of the unit appears suitable for shovel yarding. High lead yard the rest of the unit. Yard away from Class III stream on western boundary. RRZ 9/14/89</p>
REMARKS	<p>Remarks: No VQO for this unit should be met. This unit is viewed from a vantage point boat anchorage in Trap Bay. See attached</p>



Group 2 Unit 29

417 only

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>237</u>	EIS UNIT <u>26</u>	ACRES <u>85</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>—</u>	VOLUME FEIS <u>2013</u>	VOLUME CRUISE <u>—</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>40B</u>	<u>476-24</u>	<u>(7-21-76)</u>	
OBJECTIVES			
PLANNED (ORTHO PHOTO) SCALE: <u>—</u>			



SILVICULTURE	OBJECTIVE / PRESCRIPTION: <u>Element harvest followed by natural regeneration. Average site index for unit is Fair 75. Return an average of 2 snags per acre for diversity. At age 12-18 precommercially thin with a wildlife emphasis.</u>		
SOILS	HIGH HAZARD AREA <input checked="" type="checkbox"/>	OBJECTIVE / PRESCRIPTION: <u>Site specific on ground RW-81. Mass wasting hazard and active slides in area of unit. Major unit modification required. Drop baseline 100 yards down slope. RAC 9/89</u>	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD <u>—</u>	OPEN ROAD <u>—</u>	OBJECTIVE / PRESCRIPTION: <u>Keep open for General Traffic</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING <u>—</u>	CLASS II CROSSING <u>—</u>	CLASS III CROSSING <u>—</u>
OBJECTIVE / PRESCRIPTION:	FHWU <u>—</u> TEMPERATURE SENSITIVITY: YES <u>—</u> NO <u>—</u>		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (See attached)		
OBJECTIVE / PRESCRIPTION:	<u>Large unit size adjacent to riparian habitat close to deer winter range. Snags should be left in small clumps near the bottom of this unit near the riparian habitat.</u>		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>—</u>		
CULTURAL	KNOWN SITE <u>—</u> PROBABILITY ZONE: HIGH <u>—</u> MEDIUM <u>—</u>		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Portion of unit below road appears suitable for shovel yarding. High lead yard rest of unit.</u>		
REMARKS	<u>RRZ 9/14/89</u>		

NO CONCERNS. IDENTIFIED

SEP 9/89

SEE ATTACHED

UNITS MEETS ASSIGNED UPO OF MODIFICATION

Remarks: See attached

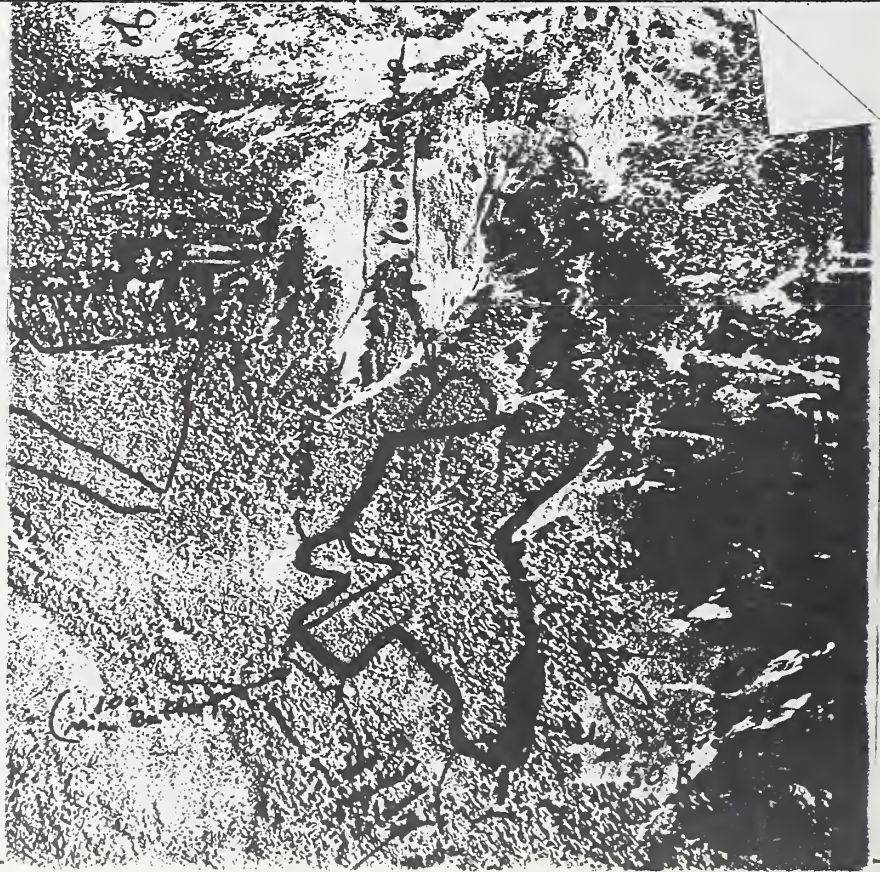
A1 + 7 only

81-90/SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU	237	EIS UNIT	27	ACRES	70	LOGGING SYSTEM	HL
STAND		VOLUME FEIS	2050	VOLUME	CRUISE		
SALE NAME	AA	06					
PHOTO LINE AND NUMBER	40B	476-24	7-29-76				

OBJECTIVES

PLANNED (ORTHO PHOTO)	SCALE:
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SILVICULTURE	OBJECTIVE / PRESCRIPTION:
	Clear-cut harvest followed by plant of Sitka Spruce on soils map unit S034b. Portion of unit S034b is appropriate for shovel yarding. Average site index is Fair 90. Lower portion of unit below road is low productivity (SITE 49). Return an average of 2 swags per acre productivity.

SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:
		SEE ATTACHED

RESULTS OF MONITORING:	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
ROAD LOCATION AND OBJECTIVE			Keep open for General Traffic

FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FMU I	FMU II	FMU III
OBJECTIVE / PRESCRIPTION:	TEMPERATURE SENSITIVITY: YES	NO	NO
	and water quality. Multiple Class I channel integrity segment within unit 27. BS Channel Type.		

WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES	YES (SEE ATTACHED)
	OBJECTIVE / PRESCRIPTION:	
	The lower 1/2 of this unit lies within riparian habitat.	
	35 acres	

VISUAL RECREATION	OBJECTIVE / PRESCRIPTION:
	UNIT MEETS ASSIGNED UPO OF MODIFICATION
	SEE ATTACHED

CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH	MEDIUM
	OBJECTIVE / PRESCRIPTION:		

LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION:
	Large portion of unit appears suitable for shovel yarding. Grabinski yard rest of unit with one end suspended. Yard away from class I-II stream in center of unit. Yard away from class I stream and buffer in SW corner of unit. 9/14/89

REMARKS
Recreation: See Attached

A14. 7 only

NOTE: This is a SLIGHT variation of Unit C2. Same format apply. There are 2 cards

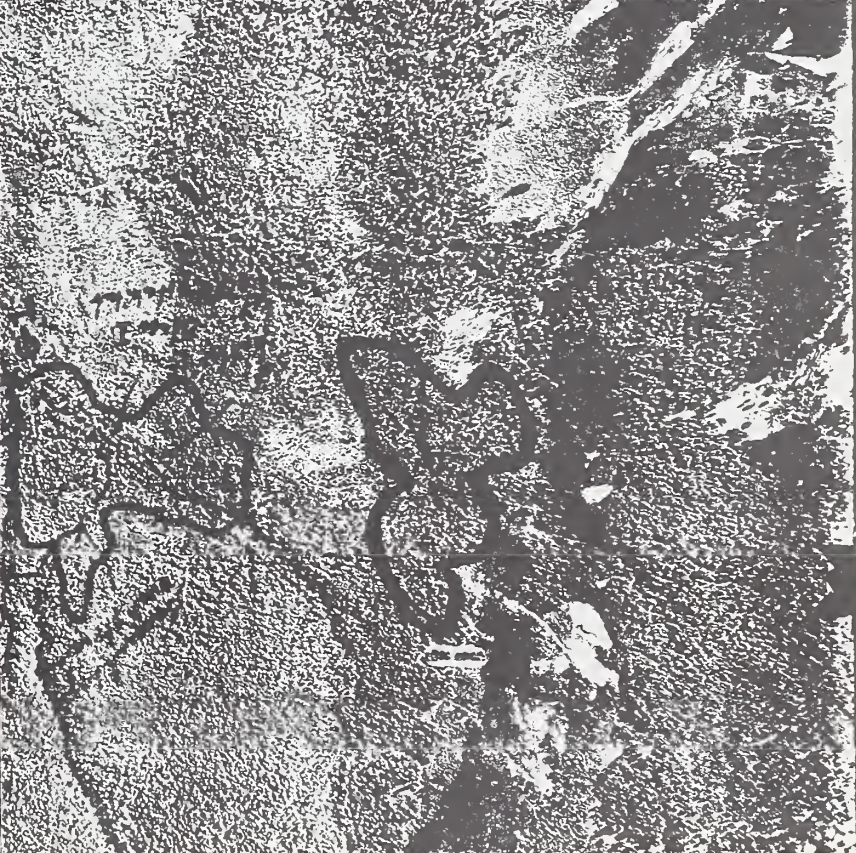
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU	237	EIS UNIT	29	ACRES	53	LOGGING SYSTEM	HL
STAND		VOLUME FEIS	1166	VOLUME	CRUISE		
SALE NAME	AA	26					
PHOTO LINE AND NUMBER	39B	476-67	(729-26)				

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____

Photo NOT Correct - Picture is 30 ac. 4 units is 53 ac.



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. The northern portion of this unit below the road is low productivity (Fam site 49). The remaining up slope portion is high productivity (site index 100) - Average 83 Fam. Monitor portion above road and precommercially thin with a timber emphasis at 12-18 years of age. Retain an average of 2 snags per acre for diversity.
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____

Shovel yard if unit meets criteria and there is deflection problem.
RW 9/89

RESULTS OF MONITORING:
ROAD LOCATION AND OBJECTIVE
CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: _____

FISHERIES / HYDROLOGY	OBJECTIVE / PRESCRIPTION: _____
WILDLIFE	OBJECTIVE / PRESCRIPTION: _____

CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
FHWY _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

NO CONCERNS IDENTIFIED 7/89 SEP
NO fee Attached

UNIT MEETS ASSIGNED VPO OF MODIFICATION
SEE ATTACHED

VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: _____
CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____

LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Large portion of unit appears suitable for shovel yarding. The southern portion of the unit too steep for shovel yarding can be highlead yarded
REMARKS	RRZ 9/14/89 Recreation: See Attached

Alt 7 on 64 81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>237</u>	EIS UNIT # <u>30</u>	ACRES <u>81</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>—</u>	VOLUME FEIS <u>2268</u>	VOLUME CRUISE <u>—</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>38B</u>	<u>476</u>	<u>117</u>	

OBJECTIVES	
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SILVICULTURE	OBJECTIVE / PRESCRIPTION: <u>Clearcut harvest followed with natural regeneration. This is a mixture of medium and high sites ranging from site index (for) 70 to 100. Average value is 90. Monitoring regeneration and periodically thinning at 12-15 years with a thinning emphasis. Retain an average of 2 snags per acre.</u>
SOILS	HIGH HAZARD AREA <u>—</u> OBJECTIVE / PRESCRIPTION: <u>See Attached</u>

RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD <u>—</u> OPEN ROAD <u>—</u> OBJECTIVE / PRESCRIPTION: <u>Discourage Traffic Allow to grow Closed</u>

FISHERIES / HYDROLOGY	CLASS I CROSSING <u>—</u> CLASS II CROSSING <u>—</u> CLASS III CROSSING <u>—</u> FHW <u>—</u> TEMPERATURE SENSITIVITY: YES <u>—</u> NO <u>—</u>
OBJECTIVE / PRESCRIPTION:	<u>NO CONCERNS IDENTIFIED</u>

WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>No</u> OBJECTIVE / PRESCRIPTION: <u>This unit is not located within emphasis species habitat. Timber production should be emphasized here. As practice & safe, retain 2 snags and/or standing culls per acre. Down cut logs in various stages of decomposition, should not be yarded. Road access to this area should be restricted unless needed for timber mgmt.</u>
RECREATION	UNIT MEETS ASSIGNED UPO OF MODIFICATION <u>SEE ATTACHED</u>

CULTURAL	KNOWN SITE <u>—</u> PROBABILITY ZONE: HIGH <u>—</u> MEDIUM <u>—</u> OBJECTIVE / PRESCRIPTION:
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LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>High lead yard uphill.</u>
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REMARKS	<u>RRZ 9/15/89</u> <u>Recreation: see attached.</u>
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66

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU 237 EIS UNIT # 226 ACRES 46 LOGGING SYSTEM HL
STAND # AA 06 VOLUME FEIS 1118 VOLUME CRUISE 176-267
SALE NAME 41 176-267 7-27-76
PHOTO LINE AND NUMBER

OBJECTIVES
PLANNED (ORTHO PHOTO) SCALE: 1" = 100'



SILVICULTURE	OBJECTIVE / PRESCRIPTION: <u>Clearcut harvest followed by natural regeneration. This is a moderately productive site (Fav 82). Presum. thin at age 12-18 yrs. with wildlife emphasis. Retain an ave. of 2 snags per ac. for diversity.</u>
SOILS	HIGH HAZARD AREA <u>overstepped slopes at backline E. side.</u> OBJECTIVE / PRESCRIPTION: <u>Split yard away from centrally bisecting V-shaped to avoid soil disturbance on V-notch shoulder. Results may be requested for field review if needed RPD 9/57</u>
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD <u>Keep open for General Traffic</u> OPEN ROAD <u>Keep open for General Traffic</u> OBJECTIVE / PRESCRIPTION:
FISHERIES / HYDROLOGY	CLASS I CROSSING <u>1</u> CLASS II CROSSING <u>NO</u> CLASS III CROSSING <u>NO</u> FHMU <u>III</u> TEMPERATURE SENSITIVITY: YES <u>NO</u> OBJECTIVE / PRESCRIPTION: <u>Maintain Water Quality in Class III streams.</u>
WILDLIFE	<u>A1 channel type 9/89 SXP</u> IN HABITAT FOR OLD GROWTH SPECIES <u>Yes (see attached)</u> OBJECTIVE / PRESCRIPTION: <u>Best unit size in deer winter range and old growth habitat is 40 acres or less with the average size 10 acres.</u>
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>LA INAT DURING LAYOUT TO ENSURE UNIT MEETS ASSIGNED UGD PARTIAL RETENTION SEE ATTACHED</u>
CULTURAL	KNOWN SITE <u>PROBABILITY ZONE: HIGH MEDIUM</u> OBJECTIVE / PRESCRIPTION:
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Highlead yard. Spur roads will be needed on each side of the Class III stream. Yard away from the stream and protect the stream buffer. Involves both up and downhill yarding. RPD 9/15/89</u>
REMARKS	<u>Memorandum: See Attached</u>

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 237 EIS UNIT # 227 ACRES 71 LOGGING SYSTEM HL
 STAND # 1468 VOLUME FEIS 1468 VOLUME, CRUISE
 SALE NAME AAO6
 PHOTO LINE AND NUMBER 41 176-267 7-27-76

OBJECTIVES

SILVICULTURE

Forest site 90. minute regeneration and premium. This at age 12-18 yrs. with a wildlife emphasis. Retain an ave. of 2 snags per acre for diversity.

SOILS

HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION:

See Attached

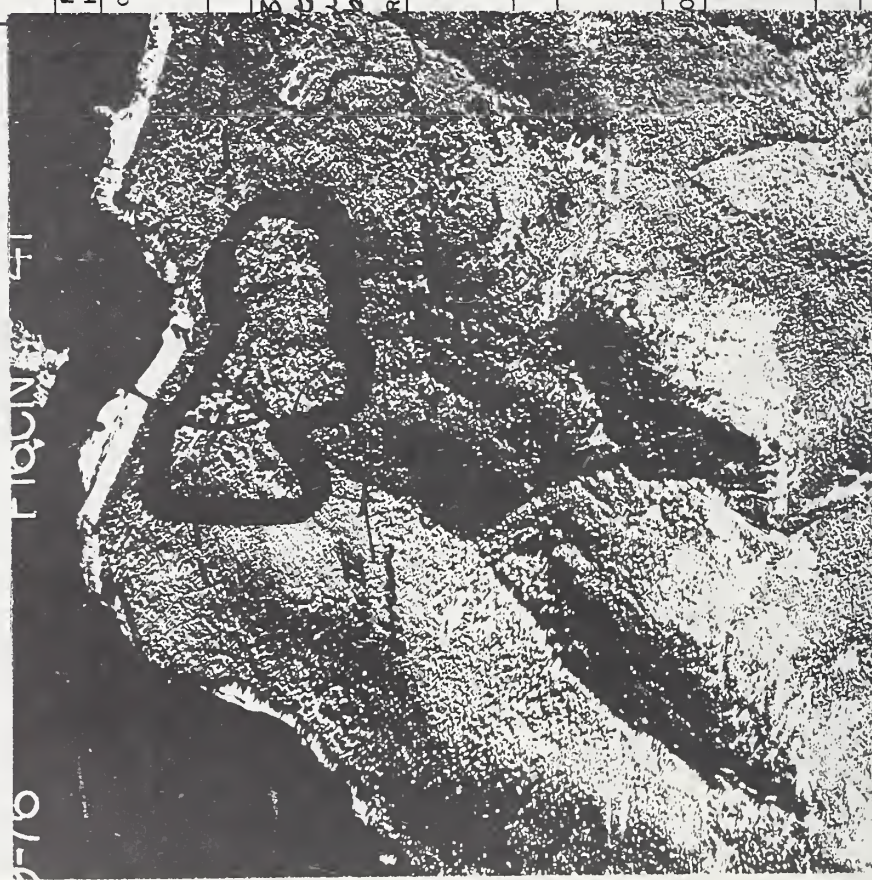
RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION:

Keep open for Gravel Traffic

PLANNED (ORTHO PHOTO) SCALE:



FISHERIES / HYDROLOGY

CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
 FHMU III TEMPERATURE SENSITIVITY: YES NO X

OBJECTIVE / PRESCRIPTION:

Maintain Water Quality in Class III stream

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES 9/89 See attached
 OBJECTIVE / PRESCRIPTION: (71ac)

Best unit size with an average of 10 acres. Provide wind firm corridors every 1/4 mile to allow access to beach fringe habitat during winter.

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION:
LA UNIT DURING LAYOUT TO ENSURE UNIT MEETS ASSIGNED VPO PARTIAL RETENTION SEE ATTACHED

CULTURAL

KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Majority of unit appears suitable for shovel yarding. Highlead yard rest of unit. Split settings to yard away from Class III stream running through unit. RRZ 9/14/89

REMARKS

Vegetation: See Attached

G4

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU 237 EIS UNIT # X28 ACRES 109 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 2654 VOLUME CRUISE 400
 SALE NAME AA 06 PHOTO LINE AND NUMBER 476-24 7-29-89

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE: _____



SILVICULTURE OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Average site index for unit is 75. Retain an average of 2 snags per acre for diversity. At age 12-18 precommercially thin with a wildlife emphasis.

SOILS

HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____

SEE ATTACHED

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: _____

Keep open for General Traffic

FISHERIES / HYDROLOGY

CLASS I CROSSING _____ CLASS II CROSSING L CLASS III CROSSING _____ FHWY II TEMPERATURE SENSITIVITY: YES _____ NO X

OBJECTIVE / PRESCRIPTION: Directionally fell away from buffer MAINTAIN CHANNEL INTEGRITY AND WATER QUALITY IN CLASS II/III channels

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES _____ OBJECTIVE / PRESCRIPTION: _____

Large units restrict options in future entries. They make it difficult to maintain habitat diversity throughout the rotation period.

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION: _____

LA INPUT DURING LAYOUT REQ'D TO ENSURE UNIT MEETS ASSIGNED UFG MODIFICATION

CULTURAL

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION: _____

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: By putting in a rather long spur road, the unit can be yarded with a combination of high lead and Grabinski yarding with one end suspended. Grabinski yard east portion of unit, high lead rest. If no spur road is built, then slacking yard strip across unit. RAZ 9/14/89 off stream buffer

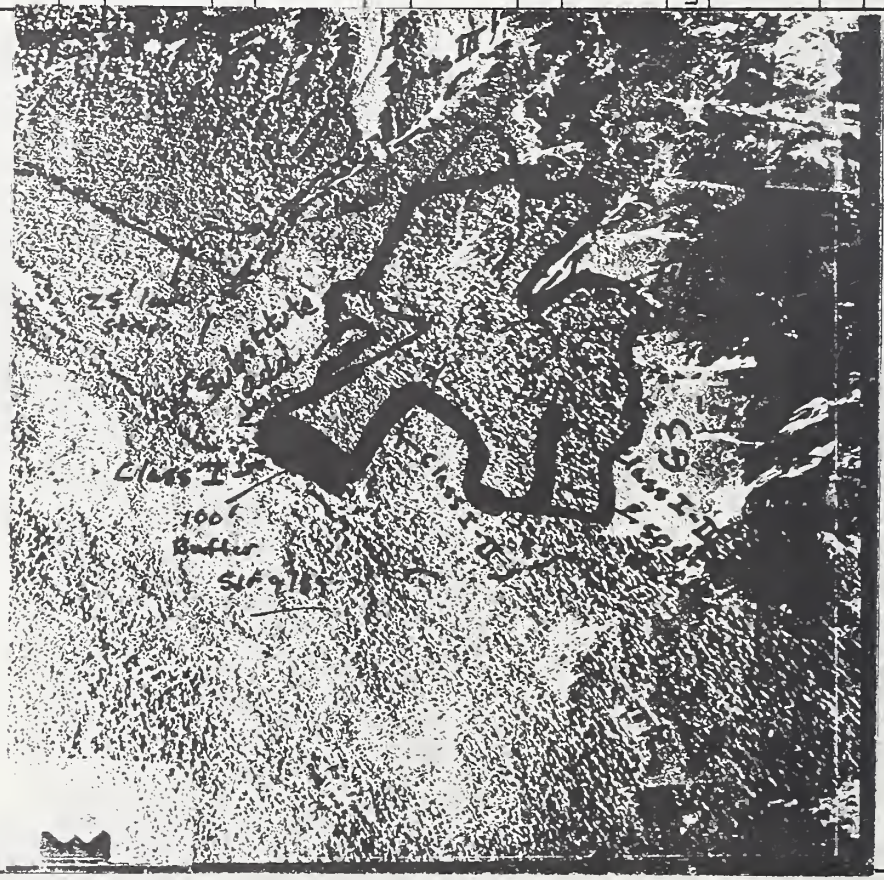
REMARKS

Recreation: The visual quality objective should be met on this unit. This unit is visible from a recognized recreation site, an anchorage at Trap Bay. See Attached.

Old 63

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 237	EIS UNIT # 229	ACRES 98	LOGGING SYSTEM H/L
STAND #	VOLUME FEIS 3034	VOLUME CRUISE	
SALE NAME	A A O G		
PHOTO LINE AND NUMBER	40B	476-24	7-27-76
OBJECTIVES			
SILVICULTURE Unit ± 20% slope is appropriate for shovel yarding. Plant also needed due to poor seedling. Ave. Side under Form is 90. Lower portion of unit below road is low productivity (3.44 q). Return an average of 2 snags per acre for diversity.			
SOILS HIGH HAZARD AREA SEE ATTACHED			
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: Keep open for General Traffic			
FISHERIES / HYDROLOGY CLASS I CROSSING <input checked="" type="checkbox"/> CLASS II CROSSING — CLASS III CROSSING — FHMU I TEMPERATURE SENSITIVITY: YES — NO — OBJECTIVE / PRESCRIPTION: Maintain Habitat Capability and Water Quality in Class II stream. B.S. channel the Directionally felt away from buffers (see attached sheets) 5/10/89			
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES YES (see Attached) OBJECTIVE / PRESCRIPTION: The lower 1/2 of this unit lies within riparian habitat (45ac)			
VISUAL RECREATION OBJECTIVE / PRESCRIPTION: LA INPUT DURING LAYOUT REPT TO ENSURE UNIT MEETS ASSIGNED UPO MODIFICATION SEE ATTACHED			
CULTURAL KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM — OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: Large portion of unit appears suitable for shovel yarding. Grabinski yard rest of unit with one end suspended. Yard away from and protect buffers around Class I-II streams in unit. RRZ 9/14/89			
REMARKS Recreation: The VOD should be met in this unit because it is visible from a recognized recreation site, an anchorage in Trap Bay. See attached			



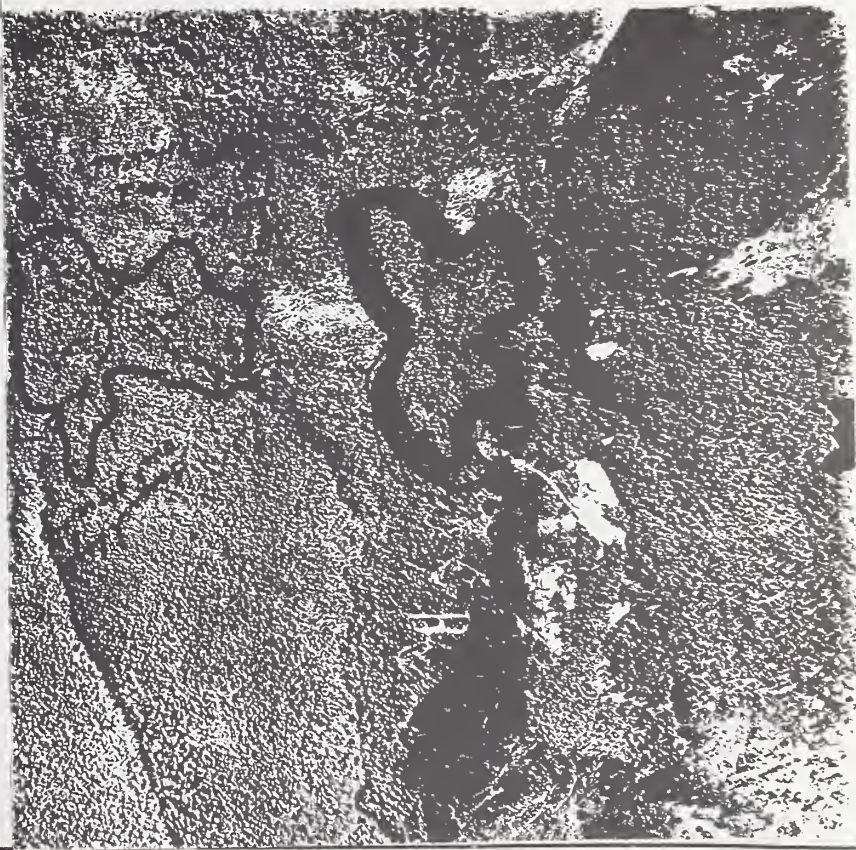
old 62

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 237 EIS UNIT # 430 ACRES 4 LOGGING SYSTEM HL
STAND # AA 06 VOLUME FEIS 705 VOLUME CRUISE 1091
SALE NAME AA 06 PHOTO LINE AND NUMBER 393 476 67 7-29-76

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE
OBJECTIVE / PRESCRIPTION: clearcut followed with natural regeneration, average site productivity is high
Furn site 92, monitor regeneration and preserve thin at age 12-18 yrs. with a wildlife emphasis. Retain an ave. of 2 snags per acre for diversity.

SOILS
HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: see Attached PAW 7/89

RESULTS OF MONITORING:
ROAD LOCATION AND OBJECTIVE
CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Keep open for Germal Traffic

FISHERIES / HYDROLOGY
OBJECTIVE / PRESCRIPTION: Maintain water quality in Class III stream.
CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING ☒
FHMU III TEMPERATURE SENSITIVITY: YES _____ NO ☒
A1 channel type 7/89 SW

WILDLIFE
IN HABITAT FOR OLD GROWTH SPECIES Yes (see Attached)
OBJECTIVE / PRESCRIPTION: (30ac) DWR & Old Growth (30ac) Best unit size in deer winter range is less than 40 acres with an average of 10 acres. Provide a wind firm corridor every 1/4 mile to all access to beach fringe habitat in winter.

VISUAL RECREATION
OBJECTIVE / PRESCRIPTION: UNIT MBERS ASSIGNED 140 OF MODIFICATION
SEE ATTACHED

CULTURAL
KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
OBJECTIVE / PRESCRIPTION: _____

LOGGING SYSTEM
OBJECTIVE / PRESCRIPTION: Large portion of the unit appears suitable for shovel yarding. The southern portion of the unit top steep for shovel yarding can be highlead yarded.

REMARKS
RRZ 9/14/89
Location: See Attached

(61)

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 237 EIS UNIT # X31 ACRES 50 LOGGING SYSTEM H/L
STAND # AA 06 VOLUME FEIS 1309 VOLUME CRUISE
SALE NAME AA 06
PHOTO LINE AND NUMBER 39B 476-67

OBJECTIVES

SILVICULTURE

OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. This is a high productivity site (Fav 54'00). 25% timber regeneration and preservation of thin at age 12-18 yrs. with a wildlife emphasis. Retain an average of 2 snags per acre for diversity.

SOILS

HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION:

SEE ATTACHED

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION:

PLANNED (ORTHO PHOTO)

SCALE:



FISHERIES / HYDROLOGY

CLASS I CROSSING 12 CLASS II CROSSING CLASS III CROSSING 2
FHMU I TEMPERATURE SENSITIVITY: YES NO

OBJECTIVE / PRESCRIPTION

Maintain Class I stream fish capability and Class III water quality. 9/89 SLP A1, A3, B5 channel types. Directionally following from buffer

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES Yes This unit is located

APC FEIS to be managed to provide old growth habitat (50ac) conditions through 1990. The unit is adjacent to riparian habitat to the east. Retain 2 snags in small clumps on the east side of the unit. Do not yard down cull logs.

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION

METS ASSIGNED UPO OF MODIFICATION AS PLANNED

SEE ATTACHED

CULTURAL

KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: The majority of the unit appears suited to shelter yarding. Protect Class I stream buffer. High lead yard rest of unit.

RRZ 9/14/89

REMARKS

Recreation: The VQD should be met for this unit. This area is viewed from a recognized recreation site, a boat anchorage in Trap Bay. See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOI <u>238</u>	EIS UNIT # <u>297</u>	ACRES <u>33</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>604</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>42</u>	<u>238</u>		
OBJECTIVES be kept out taking advantage of topography to make two large preserve areas and one small feeding unit.			
PLANNED (ORTHO PHOTO) SCALE: <u>1" = 100'</u>			
SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut forest followed by natural regeneration. Fair site index is mostly 100 and over. Some site index along timberline. Percent of site index at age 12-18 years ago. Fairly high density but some open areas. Unit will be highly susceptible to windthrow. Timberline will be highly susceptible to windthrow.		
SOILS	HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: Extreme hazard to landslides in 85% of unit. Soil spurs not needed on unit layout for major unit modification.		
RESULTS OF MONITORING: ROAD LOCATION <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: Open to high clearance vehicles			
FISHERIES / HYDROLOGY	CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u> FHMU <u> </u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u> OBJECTIVE / PRESCRIPTION: NO CONCERNS NOTED SEP 9/89		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> (See attached) OBJECTIVE / PRESCRIPTION: This unit is adjacent to riparian habitat of the eastern 1/2 is in deer winter range. 15 acres DWR		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: SEEB ATTACHED LA FIELD REVIEW TO ENSURE UNIT MEETS UGO MODIFICATION. IMPLEMENT ATTACHED MITIGATION METHODS.		
CULTURAL	KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION:		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Grading yard with one end suspended. Split settings to yard away from major V-notches.		
REMARKS	RRZ 9/15/89 Recreation; see attached		

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>230</u>	EIS UNIT # <u>268</u>	ACRES <u>35</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>1117</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>42</u>	<u>238</u>		
OBJECTIVES			
<p>the unit should be planted after harvest with silviculture. The young planting at Acres # 3) North of section and Precommercial thinning. Half of unit with a associated wildlife. (Under emphasis Class I). Define an area of fine snags per acre for each unit. Lower portion of unit 31.1 = 100 upland portion 79.9 = 85.</p>			
<p>SILVICULTURE</p> <p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by silviculture and artificial regeneration. The young planting at Acres # 3) North of section and Precommercial thinning. Half of unit with a associated wildlife. (Under emphasis Class I). Define an area of fine snags per acre for each unit. Lower portion of unit 31.1 = 100 upland portion 79.9 = 85.</p>			
<p>SOILS</p> <p>HIGH HAZARD AREA</p> <p>EXTREME hazard soils in about 35% of unit. Soil scientists need to review unit layout</p>			
<p>RESULTS OF MONITORING</p> <p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD</p> <p>OPEN ROAD</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>Open to high clearance vehicle</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING <u>1</u> CLASS II CROSSING</p> <p>CLASS III CROSSING</p> <p>FWU <u>1</u> TEMPERATURE SENSITIVITY: YES <u>NO</u> <u>X</u></p> <p>OBJECTIVE / PRESCRIPTION</p> <p>MAINTAIN ANADROMOUS FISH HABITAT CAPABILITY IN CLASS I STREAM. MINIMUM 100 FT BUFFER ALONG CI channel segment 7/87</p> <p>Directionally felt away from buffer</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES</p> <p>OBJECTIVE / PRESCRIPTION</p> <p>Yes (See attached)</p> <p>The lower 1/2 of this unit is in riparian habitat. Good silvicultural R4 for wildlife. 15 acres riparian</p>			
<p>VISUAL RECREATION</p> <p>OBJECTIVE / PRESCRIPTION</p> <p>SEE ATTACHED</p> <p>UNIT MEETS ASSIGNED VPO OF PR</p>			
<p>CULTURAL</p> <p>KNOWN SITE</p> <p>PROBABILITY ZONE: HIGH MEDIUM</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>Grabinski yard with one end suspended. Protect class I stream and buffer just below unit.</p>			
<p>REMARKS</p> <p>RRZ 9/15/89</p> <p>Recreation: See Attached</p>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU <u>238</u>	EIS UNIT <u>238</u>	ACRES <u>101</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>242</u>	VOLUME CRUISE <u>242</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES Improved as followed by the commercial showing with timber production emphasis in low yield with high soil index. Recalling soil boundary will be a high risk of breakdown, improved by large amount of soil to be in the unit, by leave four days per acre on			
PLANNED (ORTHO PHOTO)		SCALE: _____	



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural and artificial regeneration. About 10 Ac. in southern end of unit should be planted with soft pine after harvest. This is an obvious flat where a streambed and after competition with the anticipated. Half of unit is on site index 100 (Southern 1/2). The northern half of unit is on site index 20-25. Prescribe as follows:
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: Soils of floodplain at 5, 20% of unit easily disturbed and w/ flood risks, resulting in sediment production + possible channel switching.

ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Open to high clearance vehicles
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FISHERIES / HYDROLOGY	CLASS I CROSSING <input checked="" type="checkbox"/> CLASS II CROSSING _____ CLASS III CROSSING _____ TEMPERATURE SENSITIVITY YES NO <input checked="" type="checkbox"/> OBJECTIVE / PRESCRIPTION: Directionally fill timber away from buffer MAINTAIN ANADROMOUS HABITAT CAPABILITY IN MAINSTEM CLASS I CHANNEL AND UNIMPAIRED REMAINING TRBS. CI Channel Type SUP 9/89
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES No See attached OBJECTIVE / PRESCRIPTION

VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: LA FORD TURNING LAYOUT REQUIRED TO ENSURE UNIT MEETS ASSIGNED UPO MODIFICATION
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CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:
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LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Shovel yard portion of unit below road. Grabinski yard south facing aspect of unit with one end suspended. Highlead yard rest of unit.
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REMARKS	RRZ 9/15/89 Recreation: See attached
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81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU 238 EIS UNIT 25 ACRES 119 LOGGING SYSTEM HE
 STAND AA 06 VOLUME FEIS 4875 VOLUME CRUISE 3069
 SALE NAME AA 06
 PHOTO LINE AND NUMBER

OBJECTIVES old and ready for this thin (Est. 40 AC). Retain an average of two snags per acre for cavity nesting wildlife.



SILVICULTURE
 Should be planted with Silk Spruce following harvest (Est. 80 AC). Due to site area being commercial forest, a precommercial thinning on area that end up overstocked, with a higher snags from snags on site index far over most of unit is low. KV should be collected as precommercial thinning is completed before harvest which is 20 yrs.

SOILS
 HIGH HAZARD AREA
 N.W. backing unit 155 acres had w/ extreme wind soil, Kandelshole. Unit crosses stream.

RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD
 OPEN ROAD
 OBJECTIVE / PRESCRIPTION:
 Open to high clearance vehicles

FISHERIES / HYDROLOGY
 CLASS I CROSSING 1 CLASS II CROSSING NO CLASS III CROSSING NO
 ANNU I TEMPERATURE SENSITIVITY: YES NO
 OBJECTIVE / PRESCRIPTION: Directionally full timber away from buffer maintain wilderness habitat canopy in mainstem case I channel, side channel, C/103 channel types. 9/09 SE

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES
 OBJECTIVE / PRESCRIPTION: This is a large unit which will restrict future options to maintain wildlife habitat diversity. About 1/2 of this unit is located in riparian habitat. Implementation of fisheries buffers will partially mitigate this concern. 75 acres riparian

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: SEE ATTACHED
 UNIT MEETS ESTIMATED VPO MODIFICATION

CULTURAL
 KNOWN SITE
 PROBABILITY ZONE: HIGH NO MEDIUM NO
 OBJECTIVE / PRESCRIPTION

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: High lead yard. Protect Class I stream and buffer along bottom of unit. Due to some long reaches (1100'-1200'), short spur roads may be needed. RR2 9/15/89

REMARKS
 Recreation See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>230</u>	EIS UNIT # <u>33</u>	ACRES <u>33</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>282</u>	VOLUME CRUISE <u> </u>	
SALVAGE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u> </u>			
OBJECTIVES <u>production on the higher site (2540). Leave an average of two snags per acre for cavity nesting birds.</u>			
SILVICULTURE <u>corner of unit - should be planted with silk spruce immediately following harvest. Vigor of unit is fair site index 45, and including some large site indexes. Prescribe monitoring of regeneration followed by precommercial thinning in timber.</u>			
SOILS <u>extreme moss wasting beyond at upper boundary of unit.</u>		HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>	
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE <u>open to high clearance vehicles</u>			
FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS NOTED</u>			
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>NO (see attached)</u>			
VISUAL RECREATION UNIT MEETS ASSIGNED MODIFICATION U90 OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>			
CULTURAL KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>			
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>High lead yard. No other specific concerns</u>			
REMARKS <u>ANZ 9/15/89</u> <u>Location: See attached</u>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU <u>238</u>	EIS UNIT # <u>7812</u> ACRES <u>45</u> / <u>14</u>	LOGGING SYSTEM <u>Short</u>	STAND # <u>426</u>	VOLUME FEIS <u>393</u>	VOLUME CRUISE _____
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>42</u> <u>238</u>	OBJECTIVES _____			
SILVICULTURE			OBJECTIVE / PRESCRIPTION: <u>to site species. For site index 100. Preserve monitoring riparian and vegetation on planing. Leave on unit of two stage post care in riparian area. No logging within 100 ft of stream.</u>		
SOILS			HIGH HAZARD AREA _____ Soil erosion by road and stream Flooded potential.		
ROAD LOCATION AND OBJECTIVE			CLOSED ROAD _____ OPEN ROAD _____ 0 ft to the clearance vehicles		
FISHERIES / HYDROLOGY			CLASS I CROSSING <u>2</u> CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU <u>2</u> TEMPERATURE SENSITIVITY: YES _____ NO _____ OBJECTIVE / PRESCRIPTION: <u>MAINTAIN CLASS I HABITAT IN ANADROMOUS FISH STREAMS, SIGNIFICANT ANADROMOUS FISH HABITAT, MAINTAIN HABITAT OBJECTIVES. SHP 169 CL, AI Directionally following from buffer.</u>		
WILDLIFE			IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> (See attached) OBJECTIVE / PRESCRIPTION: <u>Fairly good unit sized boundary leaves old growth configuration for mgmt. of old growth habitat near riparian & deer winter range habitats. Leave snags in small clumps near stream corridor.</u>		
VISUAL RECREATION			OBJECTIVE / PRESCRIPTION: _____ Unit meets assigned VPO of Mod		
CULTURAL			KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION: _____		
LOGGING SYSTEM			OBJECTIVE / PRESCRIPTION: <u>Entire unit appears suited for shovel yarding. Protect Class I stream and buffer which runs through unit.</u>		
REMARKS			ARZ 9/15/89 Recreation: See attached		

PLANNED (ORTHO PHOTO) SCALE: _____



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

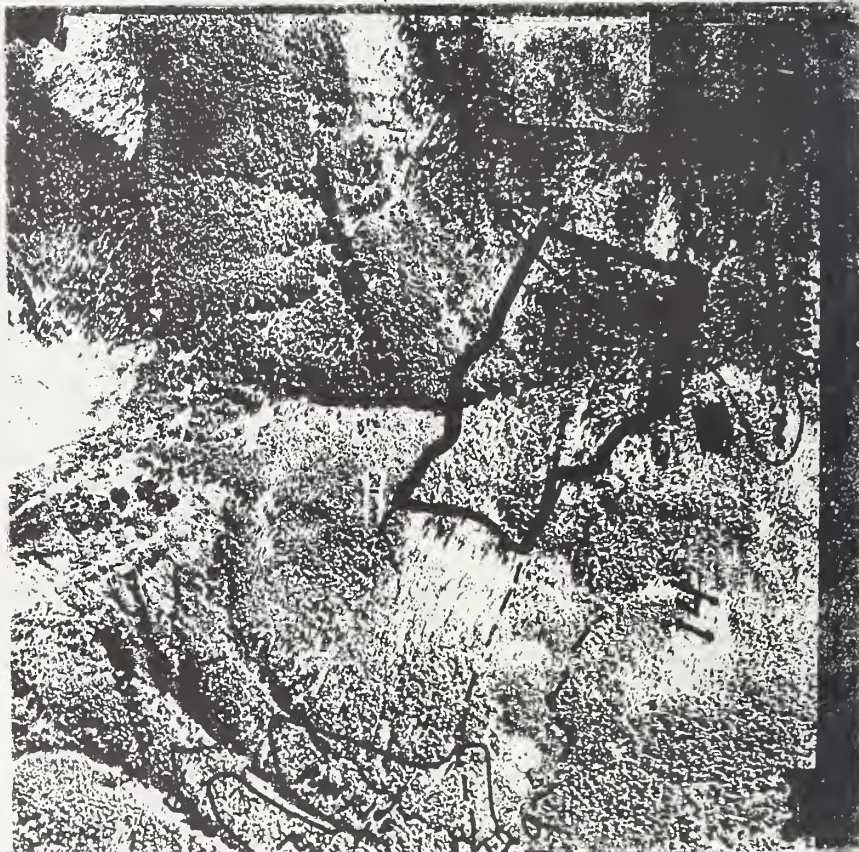
VOLUME FEIS 1638 VOLUME CRUISE 63 LOGGING SYSTEM DAE
 SALE NAME AA 06
 PHOTO LINE AND NUMBER _____
 OBJECTIVES maprods, R.V. should also be collected to
unit, being youth in NE corner, tall and be
Leave waste of four sixes, four sixes
 PLANNED (ORTHO PHOTO) _____ SCALE: _____



SILVICULTURE	OBJECTIVE / PRESCRIPTION: General forest covered by natural and artificial regeneration. About 25 Ac. of unit should be planted with spruce given anticipated competition on this area of natural outwash and asagrated disturbance. For site index is 100. Percent monitoring of regeneration should be 100% for several species with a combined wildlife, timber, production.
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>Melville clay in SE, flat corner of unit.</u> <u>low slopes increase soil disturbance</u>
RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: <u>open to high clearance vehicles</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHWU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____ OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS NOTED SEP 9/89</u>
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO (see attached)</u> OBJECTIVE / PRESCRIPTION: <u>Good silvicultural R. meets wildlife needs here.</u>
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>SEB- ATTACHED</u> <u>LA FIELD REVIEW & DESIGN TO ENSURE UNIT MEETS VGO OF MODIFICATION w/ ADJACENT UNITS</u>
CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION: _____
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Entire unit appears suited to shovel yarding.</u>
REMARKS	<u>RRZ 9/15/89</u> <u>Recreation: See Attached</u>


81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

YOU <u>238</u>	EIS UNIT # <u>4514</u>	ACRES <u>77</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>1670</u>	VOLUME CRUISE <u>41-269</u>	
SALE NAME			
PHOTO LINE AND NUMBER			
<p><u>OBJECTIVES</u></p> <p><i>K.V. should be collected for planning & placement of blowdown patches in unit adjacent to unit</i></p> <p>PLANNED (ORTHO PHOTO) SCALE: _____</p>			



SILVICULTURE	OBJECTIVE / PRESCRIPTION: clearcut forest to be planted by natural & artificial regeneration. Harvest should be planned to occur in approx 30 AC south of road accessing unit. Under this is 10-100. Another regeneration period be previous to thinning with a timber production emphasis. Aiming standard presents opportunity for commercial thinning. K.V. collected under this plan. Leave over of thinning.
SOILS	<p>HIGH HAZARD AREA</p> <p>OBJECTIVE / PRESCRIPTION: <i>hard slicks and grading and grad out at Vuchek in center of unit. Mass wasting potential. Turn out unit. Soil disturbance likely in S.E. 1/3 of unit if hi-feld. Soil input needed during layout</i></p>
RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	<p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:</p> <p><i>Local Road / Maint. Labeled #2</i></p> <p><i>Hi Clearance</i></p>
FISHERIES / HYDROLOGY	<p>CLASS I CROSSING — CLASS II CROSSING <u>L</u> CLASS III CROSSING —</p> <p>FNUU <u>I</u> TEMPERATURE SENSITIVITY: YES — NO —</p> <p>OBJECTIVE / PRESCRIPTION: <i>MAINTAIN HABITAT CAPABILITY IN CLASS I FISH STREAMS. PROTECT WATER QUALITY IN CLASS II TRIBUTARY. BS/CI channel types SRP 9/69</i></p>
WILDLIFE	<p>IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (See attached)</p> <p>OBJECTIVE / PRESCRIPTION</p>
VISUAL RECREATION	<p>OBJECTIVE / PRESCRIPTION: <i>SEE ATTACHED</i></p> <p><i>UNIT MEETS ASSIGNED UPO MODIFICATION</i></p>
CULTURAL	<p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>
LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: <i>Portion of the unit appears suitable for shovel yarding. Grabinski yard rest of unit with one end suspended. Split springs to yard away from Class III stream in unit. Protect class I stream & buffer along S. boundary RRZ 9/15/89</i></p>
REMARKS	<i>Recreation; See attached</i>

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

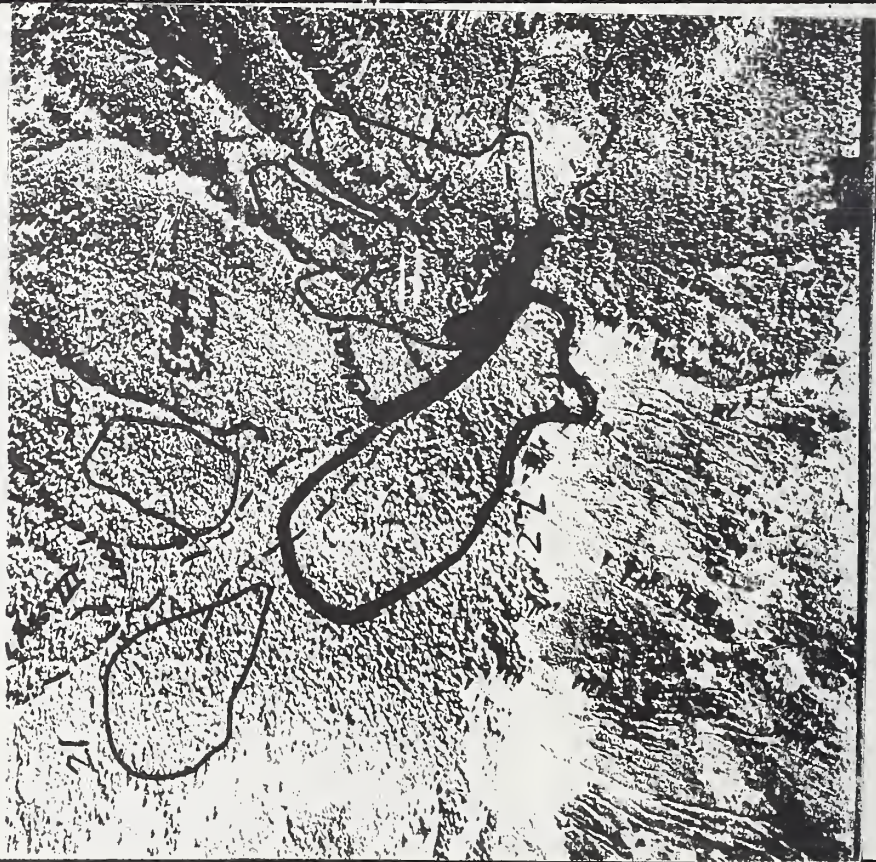
VCU <u>230</u>	EIS UNIT # <u>15</u>	ACRES <u>76</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>1916</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>41-269</u>			
<p>OBJECTIVES</p> <p>200 Acres. Sound resource mgt. might indicate leaving standing timber between units (B & H) providing seed source for planned natural regeneration. Providing access corridor for wildlife to upland habitats.</p>			
<p>PLANNED (ORTHO PHOTO)</p> <p>SCALE: _____</p>			
			
SILVICULTURE	<p>OBJECTIVE / PRESCRIPTION: cleared harvest followed by natural regeneration. For site index in approx. 35% portion natural regeneration. Leave an average of two snags per acre. The only stand separating units 18 from this unit 19 is a regenerating stand that blew down in 1968. In effect when both units are logged the resulting forest opening will be close to</p>		
SOILS	<p>HIGH HAZARD AREA</p> <p>Soil plot in unit (1952). Slide activity along V-notches & sediment routing are potential hazards.</p>		
<p>RESULTS OF MONITORING:</p> <p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION:</p> <p>Local Rd / Mount Level 2</p> <p>Clearance Vehicles only</p>			
FISHERIES / HYDROLOGY	<p>CLASS I CROSSING _____ CLASS II CROSSING <u>3</u> CLASS III CROSSING _____</p> <p>FNUU <u>ALL</u> TEMPERATURE SENSITIVITY: YES _____ NO <u>X</u></p> <p>OBJECTIVE / PRESCRIPTION</p> <p>MAINTAIN CLASS I-II FISH HABITAT CAPABILITY</p> <p>PROTECT WATER QUALITY IN CLASS III streams.</p> <p>B's, B3 channel types. 9/89 SNA</p>		
WILDLIFE	<p>IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (see attached)</p> <p>OBJECTIVE / PRESCRIPTION</p>		
VISUAL RECREATION	<p>OBJECTIVE / PRESCRIPTION:</p> <p>UNIT MEETS ASSIGNED V40 OF MAX. MOD</p>		
CULTURAL	<p>KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____</p> <p>OBJECTIVE / PRESCRIPTION:</p>		
LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: Portions of unit appear suitable for shore yarding. By building short spur roads rest of unit can be highlead yarded. Split settings to yard away from the V-notches. Yard away from and protect Class I-II stream & buffer along S boundary 9/15/89 RAZ</p>		
REMARKS	<p>Recreation: See attached</p>		

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

YOU 238	EIS UNIT # 24	14 ACRES	LOGGING SYSTEM HL
STAND #	VOLUME EIS	1569	VOLUME CRUISE
SALE NAME	AA 06		
PHOTO LINE AND NUMBER	41-269		

OBJECTIVES
 drainage, this portion has included site index base PO. Perseide precommercial thinning with timber production emphasis at age 12-18 years. Leave an average of two snags per acre for cavity nesting habitat.

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. If portion to SE of unit is added to compensate for leaving timber on other side of drainage, this part added should be followed by planting with spruce. If site index is 100 it is originally planned. If area to E is added to compensate, we leave stripe on other side of
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: NO SOILS CONCERNS

ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Maint level 2 Local Rd Hi clearance vehicle
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FISHERIES / HYDROLOGY	CLASS I CROSSING I CLASS II CROSSING _____ CLASS III CROSSING _____ FNU II TEMPERATURE SENSITIVITY: YES _____ NO _____ OBJECTIVE / PRESCRIPTION: Directionally fall away from buffer MAINTAIN ANADROMOUS / RESIDENT HABITAT CAPABILITY IN CLASS I/II STREAMS SEP 9/84 B3 channel type
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES NO (See attached) OBJECTIVE / PRESCRIPTION:

VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: UNIT MEETS ASSIGNED VPO MODIFICATION
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CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:
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LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Portions of unit appear suitable to shovel yarding. Highlead yard rest of unit.
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REMARKS	RRZ 9/15/89 Recreation: See attached
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17W

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOL 23B	EIS UNIT # 21	ACRES 17	LOGGING SYSTEM H/L
STAND #	VOLUME FEIS 833	VOLUME CRUISE	
SALE NAME AA 06			
PHOTO LINE AND NUMBER	41-269		
OBJECTIVES			
SILVICULTURE AS 95-100. Prescribed thinning with a timber production emphasis for canopy removal. Leads an average of two bags per acre for early nesting wildlife species.			
SOILS		HIGH HAZARD AREA	
NO SOILS CONCERNS		OBJECTIVE / PRESCRIPTION:	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION:	
Local Rd Mount level 2		High Clearance Vehicle	
FISHERIES / HYDROLOGY		CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING	
OBJECTIVE / PRESCRIPTION:		FMW TEMPERATURE SENSITIVITY: YES NO	
NO CONCERNS NOTED.		SUP 9/89	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES	
		NO (see attached)	
VISUAL RECREATION		OBJECTIVE / PRESCRIPTION:	
UNITS MEETS ASSIGNED UPO MODIFICATION			
CULTURAL		KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM	
		OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: High lead yard. No other specific concerns	
		RRZ 9/15/89	
REMARKS		Recreation: See attached	



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOL 238 EIS UNIT # 4618 ACRES 24 LOGGING SYSTEM HL
STAND # AA 06 VOLUME FEIS 384 VOLUME CRUISE
SALE NAME AA 06
PHOTO LINE AND NUMBER

OBJECTIVES
Highly susceptible to windthrow. Layout personnel should adjust actual layout where necessary to provide for more consideration taking advantage of irregular features.

PLANNED (ORTHO PHOTO) SCALE:



SILVICULTURE
OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Site index from 75. Moderate natural regeneration and provide a precommercial thinning of 12-18 years age with a combined wildlife, timber production emphasis. Leave an average of two snags per acre for cavity nesting wildlife species. Resulting clearcut boundaries will be

SOILS
HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION:
Delete N.E. corner if in 8 (3 acres) due to ever steepened slope & old stumps at bottom. No other soils concerns.

RESULTS OF MONITORING:
ROAD LOCATION AND OBJECTIVE
CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: Keep open for Gravel traffic

FISHERIES / HYDROLOGY
OBJECTIVE / PRESCRIPTION: NO CONCERNS NOTED SR 9/89
CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
FNU TEMPERATURE SENSITIVITY: YES NO

WILDLIFE
IN HABITAT FOR OLD GROWTH SPECIES Yes (see attached)
OBJECTIVE / PRESCRIPTION 24ac. DWR, 24ac. old growth
Best unit size in deer winter range & old growth habitat is 10 acres or less. Danger of wind throw is a particular concern here because of deer winter range.

VISUAL RECREATION
OBJECTIVE / PRESCRIPTION: SPE ATTACHED
LA FIELD REVIEW & DESIGN TO ENSURE UNIT MEETS UDO OF MODIFICATION OF ADJACENT UNITS

CULTURAL
KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
OBJECTIVE / PRESCRIPTION: High lead yard. Spur road will be needed to yard unit.

REMARKS
RRZ 9/15/89
Modification: See attached

VCU 238 EIS UNIT # 1519 ACRES 68 LOGGING SYSTEM IS/HL
STAND # _____ VOLUME FEIS 1162 VOLUME CRUISE _____
SALE NAME AA 06 _____
PHOTO LINE AND NUMBER _____

VCU 238 EIS UNIT # 1519 ACRES 68 LOGGING SYSTEM IS/HL
STAND # _____ VOLUME FEIS 1162 VOLUME CRUISE _____
SALE NAME AA 06 _____
PHOTO LINE AND NUMBER _____

OBJECTIVES

- to provide clearcut standards for earth measures.
- to be highly susceptible to windblown. Layout personnel should adjust actual layout strategy where necessary to provide windbreaks fitting a landscape of topographic features & stand conditions.

PLANNED (ORTHO PHOTO)

SCALE:



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Sub-index Five points to the following:
to 49 in the lower portion of the stand. Forest vegetation of sub-index prescription allowed the measurement of forest with a uniform emphasis (age 12-18) in areas with vigorously regenerating reproduction (est. 25 Ac.) - were an average of two species	

SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION :
<p>oversteepened slopes adjacent to V-notch present landscape along rd in SW corner of unit. V-notch bisects W central portion of unit and S central edge in E5 existing drainage.</p>		

RESULTS OF MONITORING:

RESULTS OF MONITORING:		
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD — OPEN ROAD —	OBJECTIVE / PRESCRIPTION:
		Keep open for General traffic

FISHERIES /
HYDROLOGY

CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —
FHMU ~~III~~ TEMPERATURE SENSITIVITY: YES — NO ~~X~~

OBJECTIVE / REASON: MAINTAIN WATER QUALITY.
SPLIT YARD OR SUSPEND LOGS OVER VNOTCHES CLASS III S
9/1 channel (see photo) SW 9/89.

WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>Yes (See attached)</u>
OBJECTIVE / PRESCRIPTION:	

Best unit size in deer winter range is 40 acres or less with an average of 10 acres to maintain habitat diversity.

DATE	TIME	LOCATION	VISUAL RECREATION	OBJECTIVE / DESCRIPTION: ..	STATUS
				LA FIELD REVIEW & DESIGN TO ENSURE UNIT MEETS UQO OF MODIFICATION W/ ADJACENT UNITS	SPEL ATTACHED

CULTURAL	KNOWN SITE _____	PROBABILITY ZONE ; HIGH — MEDIUM —
	OBJECTIVE / PRESCRIPTION :	


LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Slackline yard northern and southern fingers of unit. Highlead yard central portion of unit. Yard away from V notches.

RRZ 9/15/89

REMARKS	DATE
Excavation; See attached	11-1-1931

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU <u>238</u>	EIS UNIT # <u>20</u>	ACRES <u>44</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>1139</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES Revealing streamcut boundaries will be slightly susceptible to weathering. Large amount of thick silted gravel found in stream where necessary to provide windbreaks taking advantage of topographic features and stand conditions.			
PLANNED (ORTHO PHOTO) SCALE: _____			
			
SILVICULTURE OBJECTIVE / PRESCRIPTION: Clearcut forest followed by forest regeneration. For site index 40 on the valley, portions where drainage may not be as good and soil index 45 on the flatter N. slope. Provide monitoring for regeneration and prescription during 12-18 years of growth with emphasis on the first 5 years.			
SOILS HIGH HAZARD AREA <u>MURINE CLAY</u> <u>any</u> <u>After road design</u> <u>NO SOILS CONCERNS.</u>			
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE: <u>Keep open for General Traffic</u> CLOSED ROAD <u>_____</u> OPEN ROAD <u>_____</u> OBJECTIVE / PRESCRIPTION: <u>note</u>			
FISHERIES / HYDROLOGY CLASS I CROSSING <u>_____</u> CLASS II CROSSING <u>_____</u> CLASS III CROSSING <u>_____</u> FPMU <u>_____</u> TEMPERATURE SENSITIVITY: YES <u>_____</u> NO <u>_____</u> OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS NOTED SEP 9/89</u>			
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> OBJECTIVE / PRESCRIPTION: <u>44 acres of Deer winter range & 5 acres old growth habitat. Best unit size in deer winter range & old growth is 10 acres or less. Retain 2 shags & down logs per acre in small clumps near riparian area.</u> RECREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED LA FIED REVIEW & DESIGN TO ENSURE UNIT MEETS U40 OF MODIFICATION w/ ADJACENT UNITS.</u>			
CULTURAL KNOWN SITE <u>_____</u> PROBABILITY ZONE: HIGH <u>_____</u> MEDIUM <u>_____</u> OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>Portions of the unit appear suited to shovel yarding. Highlead yard rest of unit. Spur road needed to avoid blind leads in NW corner of unit.</u> RRZ <u>9/15/89</u>			
REMARKS <u>Recreation: See attached</u>			

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED	
VCU <u>230</u> EIS UNIT <u>232</u> ACRES <u>232</u> STAND <u>AA 06</u> VOLUME FEIS <u>1216</u> SALE NAME <u>AA 06</u> PHOTO LINE AND NUMBER _____ OBJECTIVES _____	LOGGING SYSTEM <u>H/L</u> VOLUME CRUISE _____ PHOTO LINE AND NUMBER _____ OBJECTIVES _____
OBJECTIVE / PRESCRIPTION: <u>in transportation route</u> HIGH HAZARD AREA <u>may require alternative road design</u> SOILS <u>Soil scrubbed needs to renew backline in steep south portion of unit.</u> RESULTS OF MONITORING: <u>Open to General Traffic</u> ROAD LOCATION <u>OPEN ROAD</u> OBJECTIVE / PRESCRIPTION: _____ AND OBJECTIVE _____	
FISHERIES / HYDROLOGY <u>NO CONCERNS NOTED.</u> OBJECTIVE / PRESCRIPTION: _____ CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FNU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____	
WILDLIFE <u>Yes (see attached) 35</u> IN HABITAT FOR OLD GROWTH SPECIES <u>Lower 1/2 of unit in deer winter</u> OBJECTIVE / PRESCRIPTION: <u>Records indicate historic use of Eagle Nest Trees with 1/2 mile of unit. Consider limited operating period for logging and road construction.</u> VISUAL RECREATION <u>SEE ATTACHED</u> LA FIELD REVIEW & PRELIMINARY TO ENSURE UNIT MEETS ASSIGNED UPO OF MODIFICATION	
CULTURAL <u>KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____</u> OBJECTIVE / PRESCRIPTION: _____	
LOGGING SYSTEM <u>Highlead yard. No other special concerns.</u> OBJECTIVE / PRESCRIPTION: _____	
REMARKS <u>RRZ 9/15/89</u> <u>Recreation: See attached</u>	



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>238</u>	EIS UNIT # <u>22</u>	ACRES <u>29</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>261</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Average Fair site index is 84. Percentile monitoring regeneration followed by monitoring. Harvest with a 10% buffer. Leave 20% rings per acre on average for early, feeding wildlife species.</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
		no soils concerns identified KW 7/89	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
			Keep open for General Traffic
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FWU	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION	NO CONCERNS NOTED SEP 9/89		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (see attached)		
	UNIT is located in deer winter range and is adjacent to riparian habitat.		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: SEE ATTACHED		
	LA HWY REQ'D DURING CAYOT TO ENSURE UNIT MEETS ASSIGNED UPO MODIFICATION		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH MEDIUM	
		OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Highlead yard. Portion of unit below road may be suited for shovel yarding. A short spur road will be needed to avoid blind leads.		
REMARKS	RRZ 9/15/89 Revised to meet DOW standards		



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU 238 EIS UNIT # 23 ACRES 146 LOGGING SYSTEM HL
 STAND # AA06 VOLUME FEIS 2336 VOLUME CRUISE 268
 SALE NAME AA06
 PHOTO LINE AND NUMBER 41

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE OBJECTIVE / PRESCRIPTION: clearcut followed by natural regeneration. Fair site index values from 80-100 with the average billings very productive. Silviculture is better. The lower portion is well drained and has small bushes. Moderate regeneration. 1/2 acre. 12-14 in. diameter average 2-3 in. diameter.

SOILS

SOIL INVENTORY transect across unit in 1982. Delete central section in backline, extreme side hazard + Active Slide. Additions can be made as marked on photo.

RESULTS OF MONITORING

ROAD LOCATION AND OBJECTIVE CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Open to High Clearance Vehicles

FISHERIES / HYDROLOGY

CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FNUU III TEMPERATURE SENSITIVITY: YES _____ NO X
 OBJECTIVE / PRESCRIPTION MAINTAIN WATER QUALITY IN CLASS III CHANNELS. LOCATE WEST UNIT BOUNDARY ABOVE UNNOTED SIDESLOPE BREAK.

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES No (See attached)
 OBJECTIVE / PRESCRIPTION Large units such as this will restrict future options to maintain wildlife habitat diversity and provide for unit dispersion.

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION: SEE ATTACHED
 UNIT MEETS ASSIGNED UGO OF MODIFICATION

CULTURAL

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM


OBJECTIVE / PRESCRIPTION: Gabinski yard with one end suspension. Portions of unit appear suitable for shovel yarding.

REMARKS

RRZ 9/15/89
 Recreation: See attached

68

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>238</u>	EIS UNIT # <u>24</u>	ACRES <u>47</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA06</u>	VOLUME FEIS <u>1217</u>	VOLUME CRUISE <u>41-267</u>	
SALE NAME <u>AA06</u>	PHOTO LINE AND NUMBER <u>41-267</u>		
OBJECTIVES Resulting clearcut boundaries will be highly susceptible to windthrow. Log skid trails will cross boundary adjacent to take advantage of topography & stand conditions in effort to minimize potential windthrow.			
PLANNED (ORTHO PHOTO) SCALE: _____			
			
SILVICULTURE OBJECTIVE / PRESCRIPTION: Clearcut forest followed by natural regeneration. Edge to box 200 ft. N of unit.			
SOILS HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: SEE ATTACHED			
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE: CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Open to High Clearance Vehicle			
FISHERIES / HYDROLOGY CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU <u>I</u> TEMPERATURE SENSITIVITY: YES _____ NO <u>X</u> OBJECTIVE / PRESCRIPTION: Ducttimely full timber away from buffer. Maintain class I fish habitat quality.			
WILDLIFE B3 channel adjacent to unit 511 9/89 IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (See attached) OBJECTIVE / PRESCRIPTION: This unit is adjacent to deer winter range and riparian habitat. Good silvicultural Rx for wildlife.			
VISUAL RECREATION OBJECTIVE / PRESCRIPTION: SEE ATTACHED LA INPUT TURNING UNIT CAPUT TO ENSURE DESIGN MEETS ASSIGNED UPO MODIFICATION			
CULTURAL KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: Portions of unit appear suited to shovel yarding. Grabinski yard rest of unit with one end suspended. Protect class I stream & buffer along S boundary of unit. RRZ 9/15/89			
REMARKS Recreation: See Attached			

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>238</u>	EIS UNIT # <u>25</u>	ACRES <u>6</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>194</u>	VOLUME FEIS <u>194</u>	VOLUME CRUISE <u>194</u>	
SALE NAME <u>AA06</u>	PHOTO LINE AND NUMBER <u>42-242</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: clearcut followed by natural regeneration. Fair sale index is 80. Prescribed management is regeneration and windiness of boundaries. Unit has within area prescribed to maintain old growth habitat in a small be preserved for experimental purposes at 12-18 year of age with a wildlife emphasis. Retain as much as possible.</p>			
HIGH HAZARD AREA		OBJECTIVE / PRESCRIPTION:	
SOILS		NO soils concern	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE		CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:	
		Open to General Traffic	
FISHERIES / HYDROLOGY		CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING — FHMU — TEMPERATURE SENSITIVITY: YES — NO —	
OBJECTIVE / PRESCRIPTION:		NO concerns noted SVP 9/8/8	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES OBJECTIVE / PRESCRIPTION: Good unit size for mgmt. of old growth & deer winter range habitat.	
VISUAL RECREATION		6 acres DWR, 6 acres Old Growth OBJECTIVE / PRESCRIPTION: SEE ATTACHED	
		LA field review & design to ensure unit meets UGO or modification w/ adjacent units	
CULTURAL		KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM — OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM		OBJECTIVE / PRESCRIPTION: High lead yard. spur road into unit may be needed.	
REMARKS		RRZ 9/15/89 Keweenaw. See attached	



VCU 238 EIS UNIT # 291 ACRES 29 LOGGING SYSTEM HL
STAND # _____ VOLUME FEIS 644 VOLUME CRUISE _____
SALE NAME AAOC
PHOTO LINE AND NUMBER 41-267

OBJECTIVES

Abstract forest all stands generated with
20 yr old spruce & hemlock. All follows should be
collected to thin the forest system of this
forestand patch on the high site (and 15 AC)
Abstract and present to join VCU for brown spruce
Abstract and present to join VCU for brown spruce
Abstract and present to join VCU for brown spruce

PLANNED (ORTHO PHOTO)



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Site index is mostly 100, Fair. Nullity corner that vehicles up on the hillside is the index Fair 100. This site is receiving regeneration and is very successful. This is at the 12-18 only a timber production emphasis. This is in the high site position (20-25).
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: SEE Attached
RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Open to High Clearance Vehicles
FISHERIES / HYDROLOGY	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU $\frac{1}{2}$ TEMPERATURE SENSITIVITY: YES _____ NO _____
OBJECTIVE / PRESCRIPTION:	MAINTAIN CLASS I HABITAT QUALITY Directionally fall timber away from buffer.
133 channel type.	SRP 9/69
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES NO (See attached) OBJECTIVE / PRESCRIPTION:
This unit is adjacent to riparian habitat. Good silvicultural Rx for wildlife.	
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: SEE ATTACHED UNIT MEETS ASSIGNED UPO MODIFICATION
CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:
GOING SYSTEM	OBJECTIVE / PRESCRIPTION: Portions of unit appear suited to shovel yarding, rest of unit can be highlead yarded. Protect class I stream i buffer along S boundary of unit. RRZ 9/15/89
REMARKS	Recreation, See Attached

610

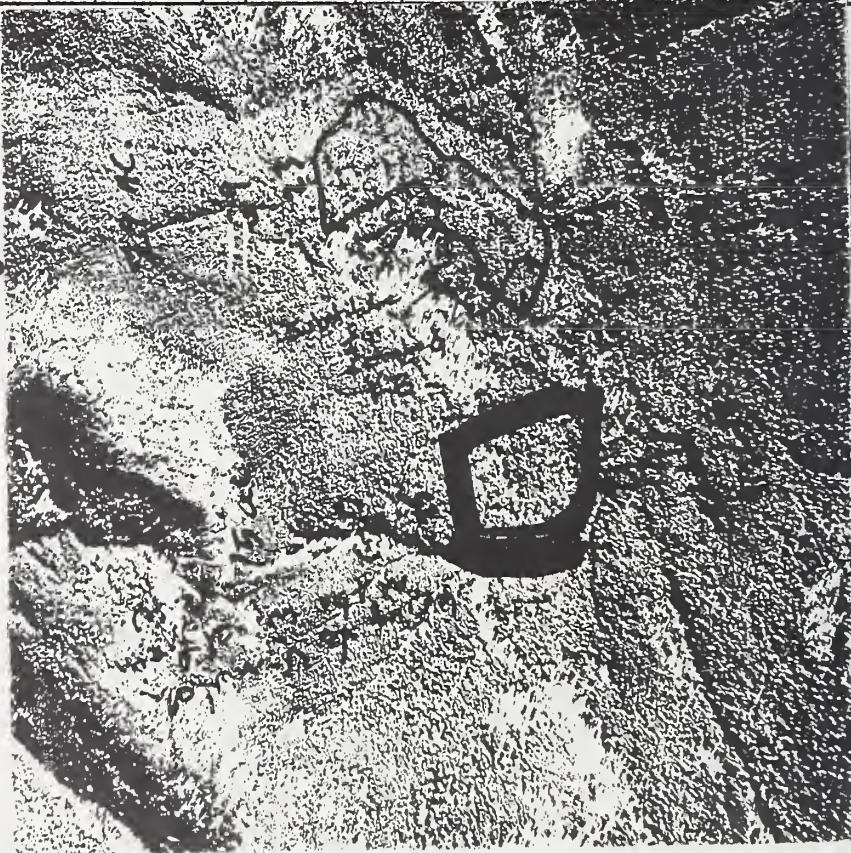
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOLUME FEIS <u>408</u>		LOGGING SYSTEM <u>HL</u>	
EIS UNIT <u>7010</u>		ACRES <u>15</u>	
STAND # <u>AA06</u>		VOLUME CRUISE <u>41-267</u>	
SALE NAME <u>AA06</u>			
PHOTO LINE AND NUMBER <u>41-267</u>			
OBJECTIVES			
<p>UNIT MEETS ASSIGNED UPO OF MAX. MOD</p>			
<p>NO CONCERNS NOTED.</p>			
<p>NO BUFFER NEEDED</p>			
<p>IN HABITAT FOR OLD GROWTH SPECIES <u>AD</u> (See Attached)</p>			
<p>WILDLIFE</p>			
<p>OBJECTIVE / PRESCRIPTION:</p>			
<p>VISUAL RECREATION</p>			
<p>OBJECTIVE / PRESCRIPTION:</p>			
<p>CULTURAL</p>			
<p>KNOWN SITE <u>PROBABILITY ZONE: HIGH MEDIUM</u></p>			
<p>LOGGING SYSTEM</p>			
<p>OBJECTIVE / PRESCRIPTION: Portions of the unit appear suitable for shovel yarding. High-lead yard rest of unit.</p>			
<p>REMARKS</p>			
<p>RRZ 9/15/89</p>			
<p>Disposition: See attached</p>			

PLANNED (ORTHO PHOTO)

SCALE:

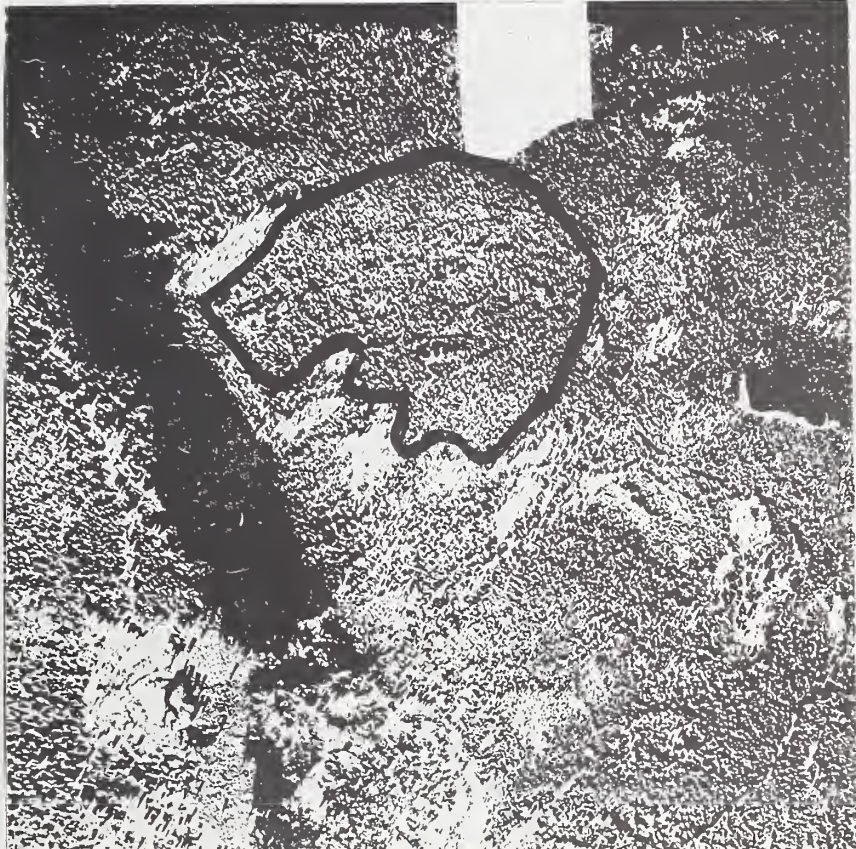
OR



VCU 239 EIS UNIT 17 ACRES 125 LOGGING SYSTEM HL
STAND # VOLUME FEIS 3325 VOLUME CRUISE
SALE NAME AA 06
PHOTO LINE AND NUMBER

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE:



SILVICULTURE
OBJECTIVE / PRESCRIPTION: Discontinue logging with natural regeneration. This is a high site productivity (Fair 100). Monitor regen. and precommercial thin with an emphasis to timber production at 12-15 years of age.

SOILS
HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION: SEE Attached

RESULTS OF MONITORING:
ROAD LOCATION AND OBJECTIVE
CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: Discontinue Traffic Allow to grow closed

FISHERIES / HYDROLOGY
OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED. SUP 9/89.
CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
FHMU TEMPERATURE SENSITIVITY: YES NO

WILDLIFE
IN HABITAT FOR OLD GROWTH SPECIES NO (see attached)
OBJECTIVE / PRESCRIPTION:

VISUAL RECREATION
OBJECTIVE / PRESCRIPTION: SEE ATTACHED

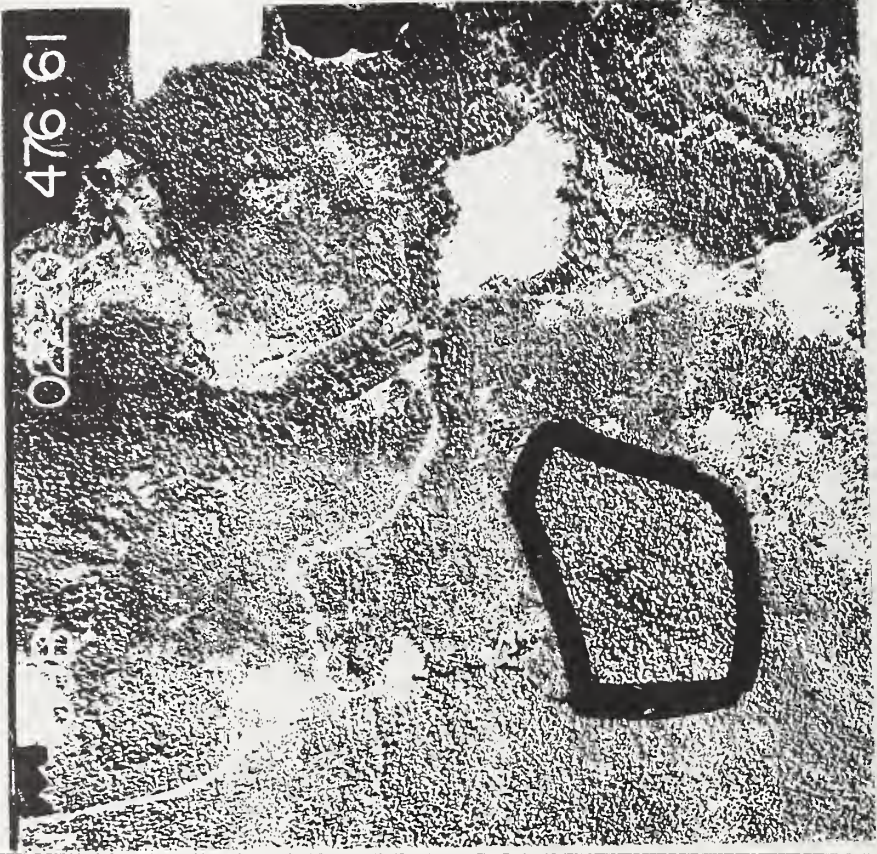
CULTURAL
Assigned VGO = PR unit does not need assigned
KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
OBJECTIVE / PRESCRIPTION: Hillock yard, no specific concerns

REMARKS
Restoration: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>239</u>	EIS UNIT # <u>59</u>	ACRES <u>776</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>1809</u>	VOLUME CRUISE <u>1809</u>	
SALVAGE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES			
SILVICULTURE OBJECTIVE / PRESCRIPTION: <u>Clearcut & forest followed by natural regeneration. This is a medium productivity site (Forest 80-87) Average CI = 85. Retain an average of 2 acres per acre for diversity. Consider additional ridge, plateau, highland volume to south-eastern part of unit.</u>			
SOILS HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>NO SEIS concerns RW 9/89</u>			
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: <u>Discourage traffic & use to be removed</u>			
FISHERIES / HYDROLOGY CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____ OBJECTIVE / PRESCRIPTION: <u>NO CONCERNS IDENTIFIED SEP 9/89</u>			
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (see attached) OBJECTIVE / PRESCRIPTION:			
VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u> <u>Assigned VGO = PR unit does not meet assigned</u>			
CULTURAL KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>Hi lead yard, no specific concerns</u>			
REMARKS <u>Navigation; see attached - Because of the proximity of the Kook Lake to the trail into the lake</u>			



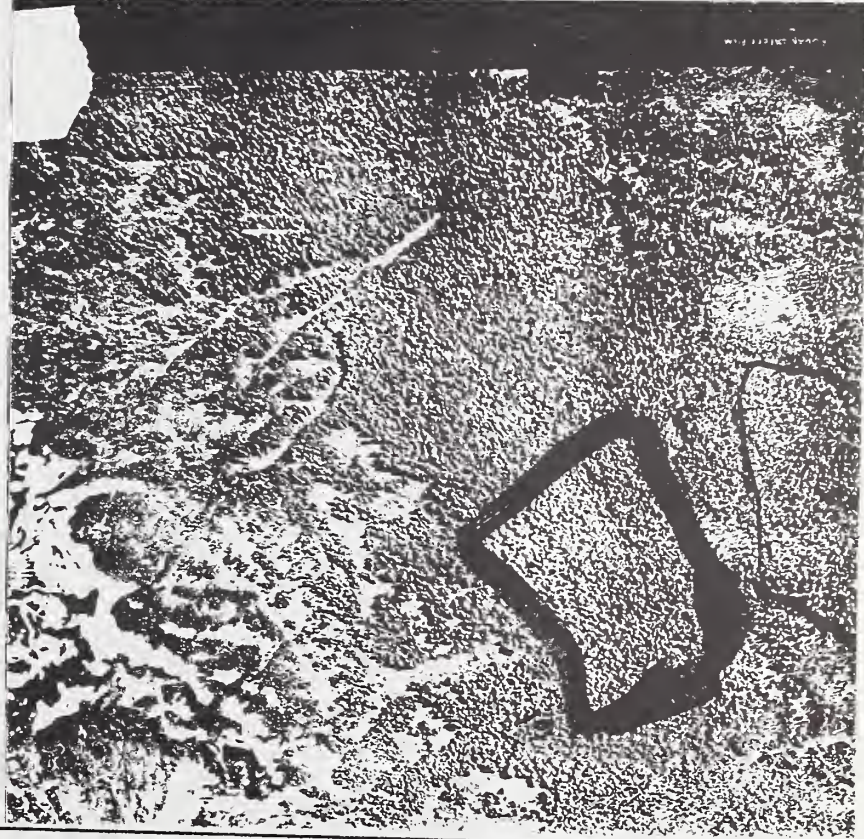
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 239 EIS UNIT # 61 ACRES 52 LOGGING SYSTEM HL
 STAND # 1383 VOLUME FEIS 1383 VOLUME CRUISE 1383
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 1383

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE: _____



SILVICULTURE

OBJECTIVE / PRESCRIPTION:

Regeneration of oak and hickory in the area. No other species are present. The area is currently in a state of natural succession. The area is currently in a state of natural succession. The area is currently in a state of natural succession.

SOILS

HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION:

SEE ATTACHED

RESULTS OF MONITORING

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION:

Discourage traffic from the area to prevent loss of wildlife.

FISHERIES / HYDROLOGY

CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHW _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

OBJECTIVE / PRESCRIPTION:

NO CONCERNS IDENTIFIED.

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES NO (SEE ATTACHED)
 OBJECTIVE / PRESCRIPTION

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION:

SEE ATTACHED

Unit does not meet assigned VPO of PR

CULTURAL

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Hilead yard no specific concerns

REMARKS

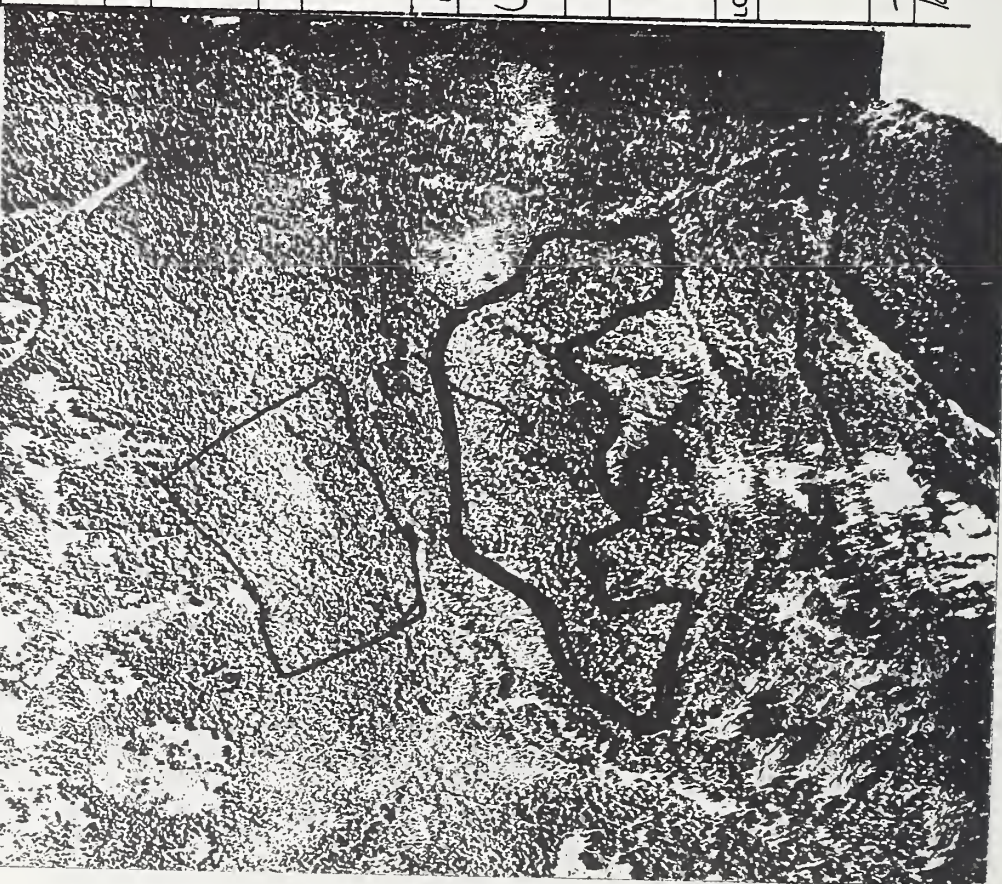
Recreation: See attached - Because of the proximity of Rock Hill Station & trail into Rock Lake

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU 239 EIS UNIT # 62 ACRES 67 LOGGING SYSTEM HL
 STAND # 1791 VOLUME FEIS 124
 SALE NAME HA 06
 PHOTO LINE AND NUMBER 38B 124

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: See attached
 CLOSED ROAD _____ OPEN ROAD _____
 DISCOVERY TRAIL to new to grow
Closed

SOILS
 HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: See attached

RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____
 DISCOVERY TRAIL to new to grow
Closed

FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED
 CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHWU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO (See attached)
 OBJECTIVE / PRESCRIPTION: SEE ATTACHED

VISUAL RECREATION
 Unit does not meet assigned VQO of PR

CULTURAL
 KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: High yield, no specific concerns

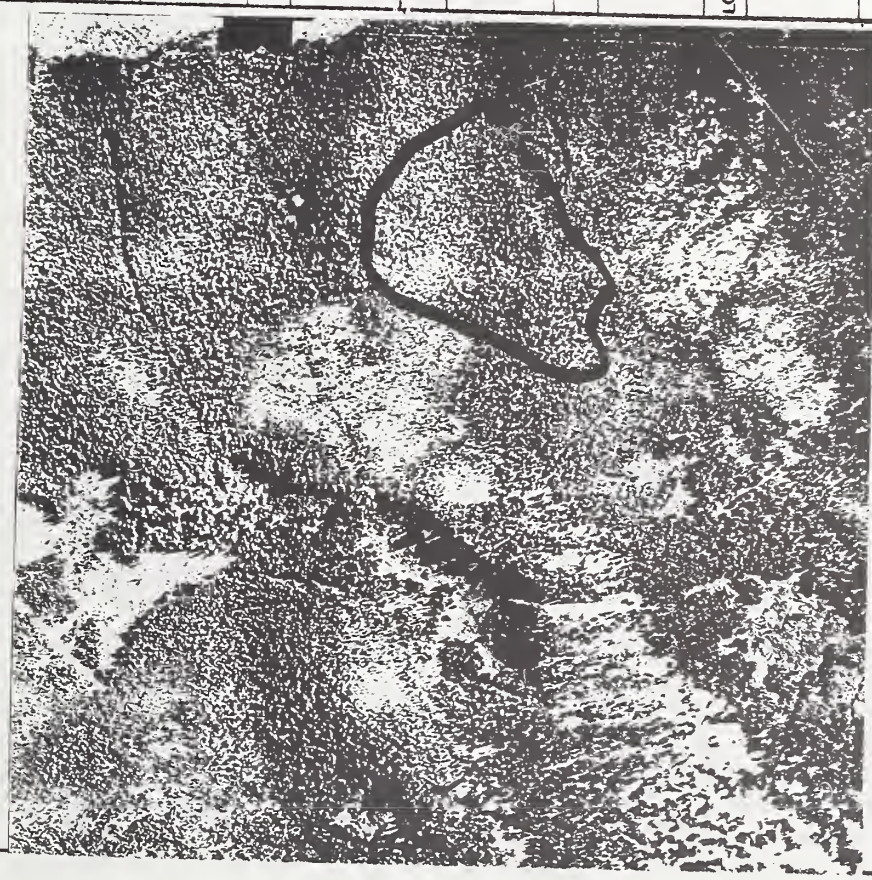
REMARKS
 Recreation: See attached, impacts look like recreation cabin + trail into look like

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VOU 239 EIS UNIT # 56 ACRES 60 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 960 VOLUME CRUISE _____
 SALE NAME _____
 PHOTO LINE AND NUMBER _____

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: *Clearcut harvest followed by regeneration. See log for details. No removal. Log for details.*

SOILS
 HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: *Road crosses extreme hazard soil zone. No soil concerns in unit. RW 9/89*

RESULTS OF MONITORING
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: *Discourage Traffic along toques Creek*

FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION: *NO CONCERNS IDENTIFIED 9/89 SKP*
 CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHW _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO (see attached)
 OBJECTIVE / PRESCRIPTION

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: *SEE ATTACHED*
Unit meets assigned VGO of Mod.

CULTURAL
 KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: *High lead yard no specific concerns*

REMARKS
Recruitment: Dec 1988

Area 26

Harvest Units

Mitigation/Enhancement ~~methods~~~~Alternative~~

VCU #	Unit #	Recreation	Visual	Wildlife	Soil	
240	234	A, B, C, E, F, G, H, I, J	A, B, C, D, E , F, G, H, I, J, K, L, M	A, G, J, K, N, O		
241	225	A, B, C, E, F, G, H, I, J, L	↓	B, G, J, K, N, O		
	226	A, B, C, E, F, G, H, I, L	↓	A, G, I, J, L		
	227	E, I	F	↓	↓	
	228	A, B, C, E, F, G, H, I, J, K	↓	B, C, E, G, J, K, N, O		
	229	A, B, C, E, F, G, H, I, J, L	↓	B, G, J, K, N, O		
	230	A, B, C, E, F, G, H, I, L	↓	↓		
	231	↓	↓	↓	↓	D, E, I, L, L1, L2
	232	↓	↓	↓	↓	C, E, H, O, P
233	↓	↓	↓	↓	C, E, H, I, O	
242	94	G, H, I	H, K			
	95	G, H, I	H, K			
	96	G, H, I	H, K			
	217	G, H, I	H, K		Alter D, M	
	218	G, H, I, J	H, K		D, E, F, L, L1, L2, ^M	
	219	G, H, I, J, L	H, K		↓ ↓	
	220	G, H, I, J	H, K		D, H	
	221	A, B, C, E, F, G, H, I	A, B, C, D, F, G, H, I, J, K, L, M		^{N, P} C, E, I, L, L1, L2	
	222	↓	↓	↓	↓	C, G, H, I, ^{L1, L2, L5} N
	223	↓	↓	↓	↓	D, G, L, L1
	224	↓	↓	↓	↓	

A

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>240</u>	EIS UNIT # <u>234</u>	ACRES <u>140</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>3844</u>	VOLUME CRUISE <u>12</u>	VOLUME CRUISE <u>98</u>
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>12</u>		

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE: _____

USDA ~ 12



SILVICULTURE	OBJECTIVE / PRESCRIPTION: <u>Clearcut harvest followed by natural regeneration. This is a high productivity site (Fair site under 90). Monitor the regeneration and at 12-18 years of age, precommercial thin with a variable density. This unit is adjacent to a previously harvested area VCU 241 stand 65 (cut in '88) and certified as regenerated in 1983. Suggest adding timber on knob and strengthening the fence strip on the south side of the unit. Return an average of 2 swags per acre for diversity.</u>
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SOILS

HIGH HAZARD AREA

OBJECTIVE / PRESCRIPTION:

soils find review needed to
reestablish stable logs in east central
portion of unit. 12/88

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____	OBJECTIVE / PRESCRIPTION: <u>Discourage Traffic & Roads to remain Closed</u>
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FISHERIES / HYDROLOGY

CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
FHCU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

OBJECTIVE / PRESCRIPTION:

NO CONCERNS IDENTIFIED 5/8/89

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES <u>Yes (see attached)</u>
OBJECTIVE / PRESCRIPTION: <u>This unit is too big. Especially considering the amount of harvest in the area in the past with no travel way between stand 65. Best unit size in deer winter range is 10 acres or less with a leave strip every 1/4 mile to allow access to the bench fringe during winter.</u>

RECREATION

UNIT DOES NOT MEET ASSIGNED UPO OF MODIFICATION

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: <u>Hi lead yard, no specific concerns</u>

REMARKS

Recreation: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>241</u>	EIS UNIT <u>225</u>	ACRES <u>52</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>885</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>12 103</u>			

OBJECTIVES	<p>OBJECTIVE / PRESCRIPTION: <u>Clearcut harvest followed by natural regeneration. This unit is in mostly in high site productivity (Class 100) but a portion also lies in SI R 3 (low) which is moderate productivity. Unit has adjacent heavily forested stands 147, 151, 152 and 153. These stands were cut in 1974, 1978, 1976 and 1978 respectively. They were cut by 1980, 1983, 1980 and 1980 respectively. Extend unit north to unit 200 boundary. Monitor regeneration, growth, fire, insect, and disease. Retain 3 small patches of old growth.</u></p>
SOILS	<p>HIGH HAZARD AREA</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p><u>Adjust unit sidelines to windfirm boundary. Center V-notch is source of slide activity and sediment production</u></p>
RESULTS OF MONITORING:	<p>ROAD LOCATION</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:</p> <p><u>Route High Clearance vehicles</u></p>
FISHERIES / HYDROLOGY	<p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING</p> <p>FHWD/III TEMPERATURE SENSITIVITY: YES — NO <u>X</u></p> <p>OBJECTIVE / PRESCRIPTION: <u>Maintain water quality in Class III channel. SLP 2/89</u></p>
WILDLIFE	<p>IN HABITAT FOR OLD GROWTH SPECIES <u>Yes (see attached)</u></p> <p>OBJECTIVE / PRESCRIPTION: <u>52 acres DWR</u></p> <p><u>Best unit size in deer winter range is 10 acres or less especially the amount of past harvest adjacent to this unit. See item 0 for possible mitigation.</u></p>
VISUAL RECREATION	<p>OBJECTIVE / PRESCRIPTION:</p> <p><u>SEE ATTACHED</u></p> <p><u>Assigned VQO = Nbd unit doesn't meet assigned</u></p>
CULTURAL	<p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>
LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: <u>Hillside yard, split setting yard away from creek through middle of unit.</u></p>
REMARKS	<p><u>Clearcut, see attached</u></p>



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 241 EIS UNIT # 226 ACRES 50 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 923 VOLUME CRUISE 12
 SALE NAME AA 06 PHOTO LINE AND NUMBER 12 103

OBJECTIVES

SILVICULTURE

OBJECTIVE / PRESCRIPTION: *This is a mostly high productivity unit (Site index records 160' above 10' after lower portion of the unit is moderate site index (Fam 80). However, adjacent to road present stands at age 12-18 are a poorer example. Try to get to 100% forest as the logging stand along the south side is a good example of a 100% forest. This unit is adjacent to two stands (103 and 103) 1977 and 1976 respectively. They were certified as regenerated in 1981 and 1980 respectively. Return an average of 2 logs per acre for diversity.*

SOILS

HIGH HAZARD AREA

OBJECTIVE / PRESCRIPTION:

NO SOILS CONCERN

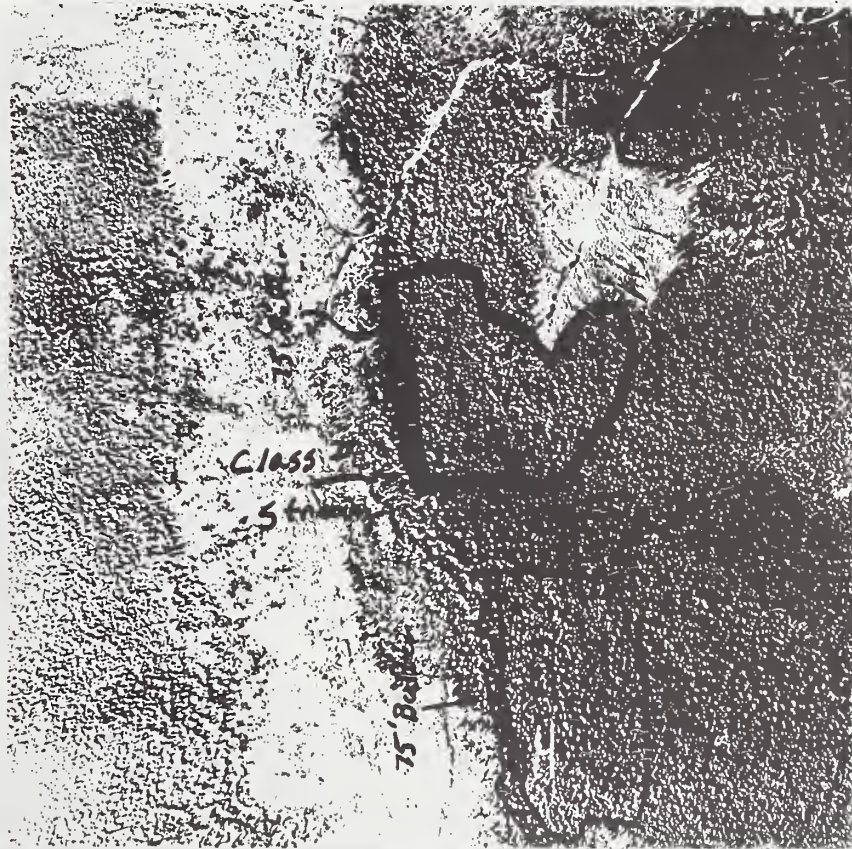
RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:
Discourage traffic a Nova Scotia road

PLANNED (ORTHO PHOTO)

SCALE: _____



FISHERIES / HYDROLOGY

OBJECTIVE / PRESCRIPTION: *Protect fish habitat and water quality in adjacent Class I streams (103). Directionally fell timber away from buffer. Sep 9/89*

WILDLIFE

OBJECTIVE / PRESCRIPTION: *IN HABITAT FOR OLD GROWTH SPECIES NO (See attached) (of past unit & size) Because of the amount of past harvest in this area a lack of habitat diversity is a concern.*

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION:

SEE ATTACHED

Assigned VQO = Mtd and doesn't meet aspect

CULTURAL

KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: *High lead yard, Folland yard away from creek buffer.*

REMARKS

Recreation: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>241</u>	EIS UNIT # <u>227</u>	ACRES <u>35</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>592</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>12</u>	<u>103</u>		

OBJECTIVES	Unit is adjacent to a previously harvested area (Stand 103) cut in 1977 and certified as regenerated in 1981.
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PLANNED (ORTHO PHOTO)	SCALE: _____
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SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. The majority of this unit is highly productive (Fam site index 95-100). A very small portion is low productivity along the western boundary (Fam site index 80-90). Suggest an timbering unit to creek and pick up scrubby timber - mix in some poor with the good. No timber regeneration. end pre-commercial thin at age 12-18 years with a timber emphasis. Unit is within the west favor stands in the center of that portion of unit lying on soil map unit 5143B. <u>Restoration average of 2.5 mgs per acre for domestic.</u>
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>NO SOILS CONCERN</u>

RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: <u>Discourage Traffic allow to grow closed</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU <u>I</u> TEMPERATURE SENSITIVITY: YES _____ NO <u>X</u> OBJECTIVE / PRESCRIPTION: <u>Maintain fish habitat capability and water quality in adjacent Class I stream.</u> <u>B3 Channel Type. See 9/89 (see attached sheet)</u>
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> (See attached) OBJECTIVE / PRESCRIPTION: <u>Wildlife habitat diversity is a concern because of the amount of past harvest & the size of past units. The size of this unit is OK.</u>
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u> <u>Assigned VGO = Mod. unit doesn't meet assigned</u>
CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Hiload yard, fell and yard</u> <u>timber away from stream buffer</u>
REMARKS	<u>Recreation: See Attached</u>

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>241</u>	EIS UNIT # <u>228</u>	ACRES <u>27</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>118</u>	VOLUME CRUISE <u>12</u>	VOLUME CRUISE <u>103</u>
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>12</u> <u>103</u>		

OBJECTIVES

OBJECTIVE / PRESCRIPTION: *Clearcut harvest followed with natural regeneration. This unit is located in a high productivity area (Farm site in the 100). Unit 228 lies adjacent to stand 103 which was logged in 1977 and clearcut regeneration in 1981. Monitor regeneration and provide thin at age 12-18 with a wildlife emphasis. Retain an average of 2 acres per acre for diversity.*

SOILS

HIGH HAZARD AREA NO OBJECTIVE / PRESCRIPTION: NO SOILS CONCERN

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD NO OPEN ROAD NO OBJECTIVE / PRESCRIPTION: Open to High Clearance vehicles

FISHERIES / HYDROLOGY

CLASS I CROSSING NO CLASS II CROSSING NO CLASS III CROSSING NO

FHMU NO TEMPERATURE SENSITIVITY: YES NO

OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES YES (see attached)

OBJECTIVE / PRESCRIPTION: Because of the amount of past harvest and the size of past units this unit should be deferred for 50 or 60 years or at least reduced to about 10 acres.

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION: 27 acres DMF, 27 acres Old Growth

CULTURAL

KNOWN SITE NO PROBABILITY ZONE: HIGH NO MEDIUM NO

OBJECTIVE / PRESCRIPTION: Assigned VQO = Mod. unit doesn't meet assigned

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Hilead yard, no specific concerns

REMARKS

Recreation: see attached



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 241 EIS UNIT *229 ACRES 55 LOGGING SYSTEM Shovel
 STAND # AA 06 VOLUME FEIS 965 VOLUME CRUISE 101
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 12

SILVICULTURE
 This unit is in a high productivity area (Four site index 100). Unit 229 is adjacent to 3 stands (83, 88, 8103) which were harvested in 1973, 1977 and 1976 respectively. All 3 are registered as regenerated in 1981. Loose inclusion of young growth in south 1/4 of unit and a small area on Northern edge of unit. Do not yield this growth. No indication of fire it for inclusion of density. Monitor regeneration and at age 12-15 place permanent plots with quadrats and 5m x 5m. Retain all coverage by 20 years for one for density.

SOILS
 HIGH HAZARD AREA NO OBJECTIVE / PRESCRIPTION:
 lack of deflection unit; result in severe soil disturbance.
 No other soil concerns

OBJECTIVES

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD NO OPEN ROAD NO OBJECTIVE / PRESCRIPTION:
 D's go road - full of a lot of grass and
 main line Road: opposite high clearance vehicle

PLANNED (ORTHO PHOTO)
 SCALE: 1:1000



FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION:
 CLASS I CROSSING NO CLASS II CROSSING NO CLASS III CROSSING NO
 FHMU NO TEMPERATURE SENSITIVITY: YES NO
 NO CONCERNS IDENTIFIED

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES Yes (See attached)
 OBJECTIVE / PRESCRIPTION: Although adjacent clearcuts are old enough to provide escape cover and good forage values the units were too large and too many in this area. The only way to mitigate deer winter range loss is to implement item 6 on

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: attached sheet 55ac. DWR
 SEE ATTACHED
 Assumed VGO = Mod. unit doesn't need assigned

CULTURAL
 KNOWN SITE NO PROBABILITY ZONE: HIGH NO MEDIUM NO
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Majority of unit appears suitable for shovel yarding. High lead yard rest of unit.
 RRZ 9/15/89

REMARKS
 Clearcutting in 1981

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>241</u>	EIS UNIT <u>230</u>	ACRES <u>92</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u> </u>	VOLUME FEIS <u>2829</u>	VOLUME CRUISE <u> </u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>12 101</u>			

OBJECTIVES	OBJECTIVE / PRESCRIPTION: <u>Clearcut. Do not follow by natural ridge crest on this unit is in a high productivity area (Fam c.k. in the 1960s). With stand 83 and 88 were certified as regenerated in 1981. Monitor regeneration and prescribe unit by thin at age 12-18 with a wildlife emphasis. Retain areas of 12 Suags per acre for diversity.</u>
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SOILS	HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u>lack of deflection may result in severe soil disturbance. No other soils concerns</u>
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ROAD LOCATION AND OBJECTIVE	RESULTS OF MONITORING: <u>DISCOVERED TRAILER 5 Hrs to town closed</u>
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FISHERIES / HYDROLOGY	CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u> FHMU <u> </u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>
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OBJECTIVE / PRESCRIPTION:	<u>NO CONCERNS IDENTIFIED</u> <u>SRC 9/60</u>
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WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO (see attached)</u> OBJECTIVE / PRESCRIPTION: <u>Because all of the deer winter range below this unit has already been cut this area is necessary to provide a travel way between existing units to get to back fringe habitats. It is also needed to provide habitat diversity & may now be used as deer winter range.</u>
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VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u> <u>Assigned VGO = Mod. unit doesn't need assigned</u>
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CULTURAL	KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>
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LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Highlead yard. Portions of unit appear suitable for steel yarding</u>
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REMARKS	<u>RRZ 9/15/89</u> <u>Recreation; see attached</u>
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81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>241</u>	EIS UNIT # <u>231</u>	ACRES <u>75</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2091</u>	VOLUME CRUISE <u>99</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>12</u>		
OBJECTIVES <i>and precommercially thin in 12-18 years of age with a wildlife emphasis. Retain an average of 2 trucks per acre for diversity.</i>			
SOILS <i>See attached</i>			
HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION:			
RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE CLOSED ROAD <u>OPEN ROAD</u> OBJECTIVE / PRESCRIPTION: <i>Discourage traffic shown to open closed</i>			
FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: <i>NO CONCERNS IDENTIFIED</i>			
WILDLIFE OBJECTIVE / PRESCRIPTION: <i>See attached</i>			
VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <i>SEE ATTACHED</i>			
CULTURAL OBJECTIVE / PRESCRIPTION: <i>Assigned VQO: Mod. unit doesn't meet criteria</i>			
LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <i>Grabinski yard with one end suspended. Continue road to end of unit, landing will be needed along lower road to yard that portion of the unit. Protect small pocket of regeneration in center of unit.</i>			
REMARKS <i>RR2 9/16/89</i> <i>Documentation: See attached</i>			



91-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER BI-90 SEIS)

VCU <u>241</u>	EIS UNIT <u>232</u>	ACRES <u>75</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u> </u>	VOLUME FEIS <u>2012</u>	VOLUME CRUISE <u> </u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u> </u>			
OBJECTIVES			
PLANNED (ORTHO PHOTO)  SCALE: <u> </u>			

SILVICULTURE	OBJECTIVE / PRESCRIPTION: <u>See attached</u>
This unit is adjacent to an established unit in 1978 and is being regenerated in 1983. Monitor regeneration and prescribe a prescription that is in line with a willow emphasis. Retain an average of 2 snags per acre for diversity.	
SOILS	HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>
RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>Discontinue traffic Monitor Growth (closed)</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING <u> </u> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u> FHMU <u> </u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <u> </u>
OBJECTIVE / PRESCRIPTION:	<u>NO CONCERNS IDENTIFIED</u> <u>SVP 9/89</u>
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> (see attached) OBJECTIVE / PRESCRIPTION: <u>The area below the road is located in deer winter range. Heavy cutting in the past has removed most of the deer winter range habitat. Location does allow for access to the beach fringe due to the road. OBJECTIVE / PRESCRIPTION: winter 40 acres DWR.</u>
RECREATION	<u>SEE ATTACHED</u> <u>Assigned VGO: Mtd unit doesn't need assigned</u>
CULTURAL	KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: <u>Grabinski yard portion of unit above road with one end suspended. Split settings and yard away from V-notch in unit. Skyline yard unit below road (shotgun system 1200-1400')</u>
REMARKS	<u>RRZ 9/15/89</u> <u>Recreation: See attached</u>

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 241 EIS UNIT # 233 ACRES 47 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 1250 VOLUME CRUISE 98
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 12

SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This is a high productivity area (see site index 100). This unit is adjacent to an area harvested in 1978 and established as regeneration in 1983. Monitor regeneration and prescribe a prescription plan in 12-18 years with a wildlife emphasis. Review an average of 2 snags per acre for diversity.

OBJECTIVES

SOILS
 HIGH HAZARD AREA See attached OBJECTIVE / PRESCRIPTION:



RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD Discourage Traffic OPEN ROAD Allows to grow Closed OBJECTIVE / PRESCRIPTION:

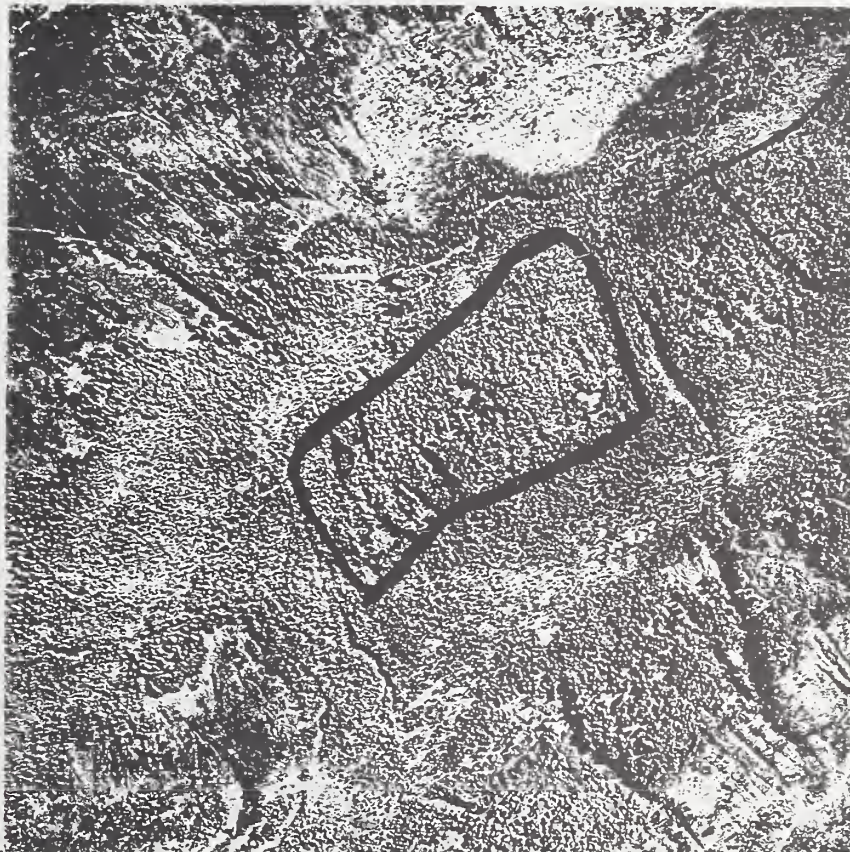
FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION: No concerns identified
 CLASS I CROSSING --- CLASS II CROSSING --- CLASS III CROSSING ---
 FHMU --- TEMPERATURE SENSITIVITY: YES --- NO ---
 WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES Yes (see attached)
 OBJECTIVE / PRESCRIPTION: The portion of this unit located below the road is located in deer winter range. The existing units below this unit removed most of the deer winter habitat in this area. This unit does allow for access to both range allowing heavy snows.

VISUAL RECREATION
 SEE ATTACHED
 Assigned VGO: ML unit doesn't need assigned
 KNOWN SITE --- PROBABILITY ZONE: HIGH --- MEDIUM ---
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspended to minimize damage to sensitive soils.
 RRZ 9/15/89
 REMARKS: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u>	EIS UNIT # <u>94</u>	ACRES <u>100</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2024</u>	VOLUME CRUISE <u>36</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>40B</u>		
OBJECTIVES			
<p>Clearcut followed by Natural regeneration. The upper portion of unit is unstable and if logged a minor portion will regenerate. Sensitive to problems with alder nearby.</p>			
<p>Soil sensitive to wildlife with bedding to check soil stability. 9/89</p>			
<p>RESULTS OF MONITORING:</p>			
<p>ROAD LOCATION AND OBJECTIVE: CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION: Discourage travel to area closed</p>			
<p>FISHERIES / HYDROLOGY: CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING — FHMU II TEMPERATURE SENSITIVITY: YES — NO —</p>			
<p>OBJECTIVE / PRESCRIPTION: MAINTAIN HABITAT / STREAM CHANNEL INTEGRITY OF A1 AND A2 channel segments adjacent to unit. (See attached 5/19/89)</p>			
<p>WILDLIFE: IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> OBJECTIVE / PRESCRIPTION: NO SPECIFIC wildlife concerns with this unit. Retain at least 2 snags/acre in clumps near muskeg or riparian areas. Road access to this drainage should be restricted at the close of logging operations. 8/89.</p>			
<p>VISUAL RECREATION: OBJECTIVE / PRESCRIPTION: SEE ATTACHED Unit meets assigned VQO of Mof.</p>			
<p>CULTURAL: KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM — OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM: OBJECTIVE / PRESCRIPTION: Grabinski yard with 1 end suspension through V-notches. A short spur road may be needed to reach northwestern portion of unit. RRZ 9/12/89</p>			
<p>Recreation: See attached.</p>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u>	EIS UNIT # <u>95</u>	ACRES <u>100</u>	LOGGING SYSTEM <u>HL</u>
STAND #	VOLUME FEIS <u>2024</u>	VOLUME CRUISE	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>408</u>	<u>36</u>		
OBJECTIVES			
<p>SOILS</p> <p>Soil Scientist to walk unit backline to check soil stability 12w 9/89</p>			
<p>RESULTS OF MONITORING:</p> <p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:</p> <p>Discourage traffic allow to grow</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —</p> <p>FHMU — TEMPERATURE SENSITIVITY: YES — NO —</p> <p>OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED</p> <p>54P 9/89</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES <u>ND</u></p> <p>OBJECTIVE / PRESCRIPTION: No specific wildlife concerns with this unit. Retain at least 2 snags / acre in clumps near muskegs or riparian areas. Road access to this drainage should be restricted at the close of logging operations.</p>			
<p>VISUAL RECREATION</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>SEE ATTACHED</p> <p>Unit meets assigned VGO of MA.</p>			
<p>CULTURAL</p> <p>KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>Grabiaski yard with 1 end suspension through V-notches. A short spur road may be needed to reach southeast corner of unit</p>			
<p>RRZ 9/12/89</p>			
<p>REMARKS</p> <p>Restoration: See Attached</p>			

PLANNED (ORTHO PHOTO) SCALE:



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u>	EIS UNIT # <u>96</u>	ACRES <u>79</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2101</u>	VOLUME CRUISE <u>200</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>41</u>		
OBJECTIVES			
<p>Clearcut followed by natural regeneration. Upper portion of unit is site index 91 (Forest) soil map unit 3657c. Prescribe monitoring upland regeneration and forest commercial thinning with a timber production emphasis for 12-18 years after harvest. Leave an average of 2 snags per acre for diversity.</p> <p>SOILS</p> <p>High Hazard Area _____</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>back of deflection may occur during layout. which would result in ground being application as 9/89</p>			
RESULTS OF MONITORING:			
<p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD _____ OPEN ROAD _____</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>Discourage traffic allow to grow closed</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____</p> <p>FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>NO CONCERNS IDENTIFIED 9/89 SEP.</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u></p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>NO specific wildlife concerns with this unit. Retain 2 snags/acre where practical and safe. Allow this spur road to grow closed.</p>			
<p>VISUAL RECREATION</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>SEE ATTACHED</p> <p>Unit meets assigned VPO of Max. Mod.</p>			
<p>CULTURAL</p> <p>KNOWN SITE _____ PROBABILITY ZONE HIGH _____ MEDIUM _____</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION:</p> <p>Highlead yarding. Potential blindleads in northern portion of unit but careful placement of landings will solve this problem.</p>			
<p>RRZ 9/12/89</p>			
<p>REMARKS</p> <p>Removal. See attached</p>			

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE

OBJECTIVE / PRESCRIPTION: Adjacent stands logged in 1975 and 1976 (std 51 and 111). These stands were certified as regenerated in 1980. This unit is on an

Excelsior site (Fawn 100). It is in section 52346 and should be scheduled for planting as soon as possible after harvest for a plant to the spruce. Portions of unit $\leq 20\%$ slope are appropriate for Aloué young Planting prescribed due to possible competition from alder and Salmobery. There are an average of 2,300 per acre for vertical distribution.

OBJECTIVES

SOILS

OBJECTIVE / PRESCRIPTION :

see Attached

RESULTS OF MONITORING:

ROAD LOCATION
AND OBJECTIVE

OBJECTIVE / PRESCRIPTION:

CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: Discourage traffic & allow to pass
Closed

FISHERIES /
HYDROLOGY

CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
TEMPERATURE SENSITIVITY: YES _____ NO _____

OBJECTIVE / PRESCRIPTION: maintain stream capability and water quality in Class I habitat
Directional fall timber away from buffer. SVP 9/89

WILDLIFE

WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> Retain 2 Snags/acre OBJECTIVE / PRESCRIPTION: <u>This</u> drainage has been heavily logged however wildlife forage and cover in the adjacent clearcut stands is large enough to allow this unit to be cut without an significant adverse affect
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VISUAL RECREATION

OBJECTIVE / PRESCRIPTION:

CULTURAL

KNOWN SITE / PROBABILITY ZONE: HIGH — MEDIUM —
OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Grubinski yard with 1 end suspension. Fell, and yard away from Class I 1. buffer on 'southeastern boundary of unit.

RRZ 9/13/89

REMARKS

Reservation: See attached



01 60 SEIS UNIT / AY01T AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU <u>242</u>	EIS UNIT # <u>218</u>	ACRES <u>92</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u> </u>	VOLUME FEIS <u>1737</u>	VOLUME CRUISE <u> </u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u> </u>			
OBJECTIVES			
PLANNED (ORTHO PHOTO) SCALE: <u> </u>			

SILVICULTURE	OBJECTIVE / PRESCRIPTION:
<p>Clearcut followed by natural regeneration. This area is an excellent site - Fair site within 90 to 100 and would be an excellent precommercial thinning opportunity with a timber production emphasis.</p>	
SOILS	HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>
SEE Attached	
RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>Open to 10' depth Clearcut vehicles</u>
FISHERIES / HYDROLOGY	CLASS I CROSSING <input checked="" type="checkbox"/> CLASS II CROSSING <u> </u> CLASS III CROSSING <u> </u> FHMU <u>I</u> TEMPERATURE SENSITIVITY: YES <u> </u> NO <input checked="" type="checkbox"/>
OBJECTIVE / PRESCRIPTION:	UNIT BISECTED BY CLASS I FISH MAINTAIN FISH HABITAT INTEGRITY AND WATER QUALITY. Directionally fell timber away from buffer strip 7/69 <u>ADD</u>
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> OBJECTIVE / PRESCRIPTION: <u> </u>
No wildlife concerns with this unit. Irregular unit boundary will provide a good amount of edge effects. Leave 2 snags are in small clumps for cavity nesting birds.	
RECREATION	VISUAL OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>
Unit meets assigned UPO of Mtd.	
CULTURAL	KNOWN SITE <u> </u> PROBABILITY ZONE: HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Grabinski yard with 1 end suspended due to sensitive soils, Fell and yard away from Class I stream and the stream buffer, protect these areas.
RRZ 9/12/99	
REMARKS	Navigation: See Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 242 EIS UNIT # 219 ACRES 17 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 551 VOLUME CRUISE _____
 SALE NAME _____
 PHOTO LINE AND NUMBER _____

OBJECTIVES

PLANNED (ORTHO PHOTO) _____ SCALE: _____

SILVICULTURE

OBJECTIVE / PRESCRIPTION: *offshoot harvest*
 (512 219 222) These stands are registered in 1981 and 1986. This unit is on an excellent site (Form 100). It is soil map unit 5234b and should be a charred riparian as possible after harvest for a plant to sitka spruce. A charred riparian can be shown garded. Planting proposed due to possible competition from alder and salix. Rejuvenation of stand 222 probably does not meet 5' top height on the stand was planted in 1982 and established in 1986.

SOILS

HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____

See Attached

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE _____ CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: _____

Open to Heavy Clearance Vehicle

FISHERIES / HYDROLOGY

CLASS I CROSSING ☒ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHMU I TEMPERATURE SENSITIVITY: YES _____ NO ☒

OBJECTIVE / PRESCRIPTION:

UNIT IS ADJACENT TO A CLASS I stream. Maintain fish habitat and water quality. L1 channel type.

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES NO Retain 2 snags / acre
 OBJECTIVE / PRESCRIPTION: *This drainage has been heavily logged however, wildlife forage and cover in the adjacent clearcut stands is large enough to allow this unit to be cut without significant adverse affect.*

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION: _____

See Attached
Unit meets assigned VPO of Max. Mod.

CULTURAL

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION: _____

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION *Grabinski yard with 1 and suspension to minimize soil disturbance. Fall away from Class I stream. No buffer specified but avoid falling trees into stream.*

RRZ 9/12/87

REMARKS

Recreation: See Attached



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u>	EIS UNIT # <u>220</u>	ACRES <u>62</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>99Z</u>	VOLUME FEIS <u>99Z</u>	VOLUME CRUISE <u>99Z</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest, Adjacent stand (std 179) harvested in 1977 and certified as regenerated in 1981. Prescribe natural regeneration. Leave an average of 2 snags per acre for cavity nesting wildlife species. Average site index is 82 (Farr).</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
		SEE attached	
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
		Open to high clearance vehicles	
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FHMU	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION:	NO CONCERNS IDENTIFIED 9/69 svp		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES		
	OBJECTIVE / PRESCRIPTION: Leave 25 snags/acre. No wildlife concerns with this unit. Placement of this unit next to an existing unit cut in 1977 is the correct timing to provide diversity and protect wildlife cover needs.		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION:		
	SEE ATTACHED		
CULTURAL	KNOWN SITE		
	PROBABILITY ZONE: HIGH MEDIUM		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION:		
	Highlead logging on both sides of road. Grabinski yard with one end suspension above road through v-notches. There could be a deflection problem on lower portion of unit below road. REZ 9/12/89		
REMARKS	Recreation. See attached.		

PLANNED (ORTHO PHOTO)

SCALE:



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u> EIS UNIT # <u>221</u> ACRES <u>80</u> LOGGING SYSTEM <u>HL</u>		OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This unit is one high site index (Faen 95), Monitor regeneration and precommercial thinning with a wildlife emphasis - 12-18 years after clearcut. Leave an average of 2 snags per acre for cavity nesting wildlife species.	
STAND # _____	VOLUME FEIS <u>2001</u>	SILVICULTURE	
SALE NAME <u>AA 06</u>	VOLUME CRUISE _____	wider (Faen 95), Monitor regeneration and precommercial thinning with a wildlife emphasis - 12-18 years after clearcut. Leave an average of 2 snags per acre for cavity nesting wildlife species.	
PHOTO LINE AND NUMBER <u>50 31</u>		SOILS	
OBJECTIVES		HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>	
PLANNED (ORTHO PHOTO) _____ SCALE: _____		RESULTS OF MONITORING:	
		ROAD LOCATION AND OBJECTIVE	
		CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: <u>Discourage Traffic New to grow cloud</u>	
		FISHERIES / HYDROLOGY	
		CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING <input checked="" type="checkbox"/>	
		FHMU <u>III</u> TEMPERATURE SENSITIVITY: YES _____ NO <input checked="" type="checkbox"/>	
		OBJECTIVE / PRESCRIPTION: <u>maintain water quality in class III streams; A3 fair channel types. 9/89 542</u>	
		WILDLIFE	
		IN HABITAT FOR OLD GROWTH SPECIES <u>YES</u>	
		OBJECTIVE / PRESCRIPTION: <u>This unit is located within an area identified in the 1986-90 APC FEIS to be managed to provide old growth habitat conditions through 1990. This unit avoids the beach fringe but the eastern 1/2 of the unit lies within deer winter range. 40 acres DWR, 80 acres old growth.</u>	
		VISUAL RECREATION	
		OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u>	
		Assigned VPO: <u>Not</u> Unit doesn't meet	
		CULTURAL	
		KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____	
		OBJECTIVE / PRESCRIPTION:	
		LOGGING SYSTEM	
		OBJECTIVE / PRESCRIPTION: <u>Grabinski yard, 1 end suspension split setting to yard away from U-notches, particularly in northern portion of unit. Spur road may be necessary in central portion of unit - if highhead yarding is to be used R2 9/12/99</u>	
		REMARKS	
		<u>Recreation: See attached</u>	



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u>	EIS UNIT # <u>222</u>	ACRES <u>110</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2926</u>	VOLUME CRUISE <u>284-29</u>	
SALE NAME <u>AA 06</u>	PHOTO LINE AND NUMBER <u>50 12</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This unit is on a high thinning with a wildlife emphasis 12-18 years after harvest. Leave an average of 2 snags per acre for cavity nesters.</p>			
<p>HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____</p>			
<p>RESULTS OF MONITORING:</p>			
<p>ROAD LOCATION AND OBJECTIVE: _____</p>			
<p>CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage travel Allow to grow cloud</p>			
<p>FISHERIES / HYDROLOGY: _____ CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____</p>			
<p>OBJECTIVE / PRESCRIPTION: No concerns IDENTIFIED SA 9/89</p>			
<p>WILDLIFE: _____ IN HABITAT FOR OLD GROWTH SPECIES NO</p>			
<p>OBJECTIVE / PRESCRIPTION: Leave 2 snags/acre This unit lies just above deer winter range and beach fringe habitat. This unit is located within an area identified in the 1984-90 APC FEIS to be managed to provide old growth habitat conditions through 1990.</p>			
<p>VISUAL RECREATION: _____ OBJECTIVE / PRESCRIPTION: _____</p>			
<p>SEE ATTACHED Assigned VPO: Mod. Unit doesn't meet.</p>			
<p>CULTURAL: _____ KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____</p>			
<p>OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspension due to sensitive soils. Yard away from creek on northern boundary of unit.</p>			
<p>LOGGING SYSTEM: _____</p>			
<p>ARZ 9/12/89</p>			
<p>REMARKS: Recreation: See attached</p>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>242</u>	EIS UNIT <u>223</u>	ACRES <u>135</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>2902</u>	VOLUME CRUISE <u>2902</u>	
SALE NAME <u>AA 06</u>	Note: Logging boundary has been moved to middle volume 66, adding east.		
PHOTO LINE AND NUMBER <u>AA 06</u>	which is in the		
OBJECTIVES			
<p>SILVICULTURE</p> <p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Unit is a complex of differing but mostly productive ranging from Fair site index 83 to 95. Leaves inclusion of young-growth near center of unit to enhance diversity. Leave an average of 2 acres per acre for vertical diversity. Pro-commercially thin stand with a wildlife emphasis age 12-18</p>			
<p>SOILS</p> <p>HIGH HAZARD AREA _____</p> <p>OBJECTIVE / PRESCRIPTION: _____</p>			
<p>RESULTS OF MONITORING:</p> <p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD _____ OPEN ROAD _____</p> <p>DISCONTINUE THE OLD ALLOWS GROW CLAD</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____</p> <p>FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____</p> <p>OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED 9/89 SVR</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES YES</p> <p>OBJECTIVE / PRESCRIPTION: The eastern 1/2 of this unit is located in an area identified in 1986-90 APC FEIS to be managed to provide old growth habitat conditions through 1990. The eastern edge of the unit also lies in deer winter range. Pattern of snag per acre concentrated on the east side of the unit.</p>			
<p>RECREATION</p> <p>VISUAL</p> <p>OBJECTIVE / PRESCRIPTION: SEE ATTACHED</p> <p>Assigned VPO = Mod. Unit doesn't meet</p>			
<p>CULTURAL</p> <p>KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____</p> <p>OBJECTIVE / PRESCRIPTION: _____</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: High lead logging. Log away from creeks in southern and northern portions of unit.</p>			
<p>RRZ 9/12/89</p>			
<p>REMARKS</p> <p>Recreation: See Attached</p>			

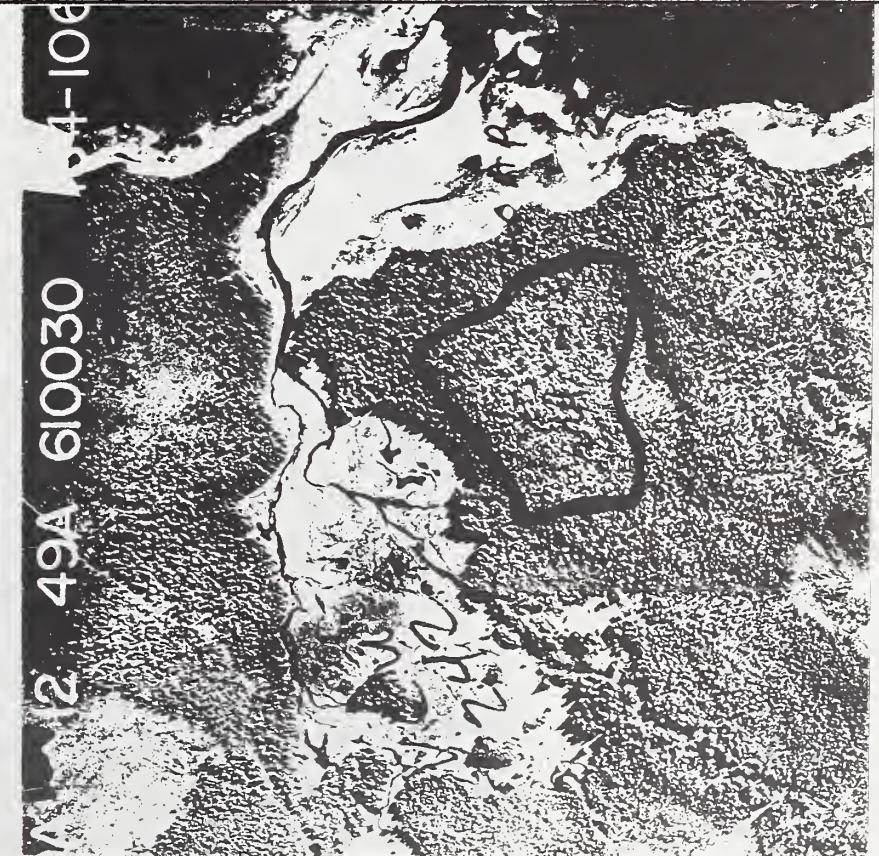


81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 242 EIS UNIT # 224 ACRES 40 LOGGING SYSTEM HL
 STAND # 884 VOLUME FEIS 884 VOLUME CRUISE 884
 SALE NAME HA 06
 PHOTO LINE AND NUMBER 884

OBJECTIVES _____

PLANNED (ORTHO PHOTO) _____ SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut harvest with natural regeneration. Prescribe monitoring of regeneration with permanent thinning at ages 12-18 with a wildlife emphasis. Leave an average of 2 snags per acre cavity nesting wildlife species. Average site index is 95 (Fair).

SOILS
 HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____
 NO soils concerns RW 9/89

RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage Traffic Allow to Grow Close

FISHERIES / HYDROLOGY
 CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____
 OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED 9/89 SHP

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES Yes 884
 OBJECTIVE / PRESCRIPTION: Entire unit lies within an area identified in 1986-90 APC FEIS to be managed to provide old growth habitat conditions through 1990. The entire unit is located in deer winter range. The size of the unit is good and the buffer on the east is OK. A unit strip is good.

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: SEE ATTACHED
 Assigned VPO = PR Unit doesn't need.

CULTURAL
 KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION: _____

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: High level logging, portions of unit are suited for shore yarding

ARR 9/12/89
 REMARKS: Recreation: See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

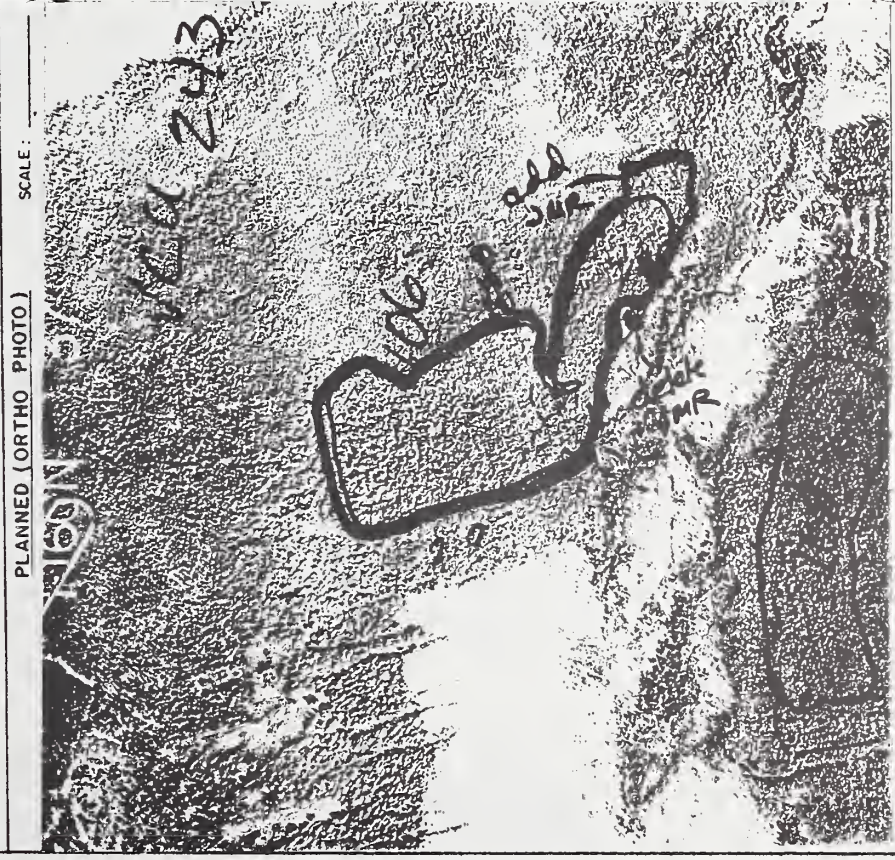
VCU 243	EIS UNIT # 105	ACRES 95	LOGGING SYSTEM HL
STAND #	VOLUME FEIS 1944	VOLUME CRUISE	
SALE NAME AA 06	37	316	
PHOTO LINE AND NUMBER			
OBJECTIVES			
Unit has a medium productivity ranging from 5 to 15 (Fair). The upper slopes are better drained and are more productive than the lower plant associations in the lower portion of the harvest unit.			
HIGH HAZARD AREA			
SOILS			
compact fill occurs in general area. May need to be considered in road layout.			
RESULTS OF MONITORING			
ROAD LOCATION AND OBJECTIVE			
CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: Discourage Traffic. Allow to grow. (Closed) 11-1-89			
FISHERIES / HYDROLOGY			
CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING			
FHMU TEMPERATURE SENSITIVITY: YES NO			
OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED 8/81 SLP			
WILDLIFE			
IN HABITAT FOR OLD GROWTH SPECIES Not applicable			
OBJECTIVE / PRESCRIPTION: This unit is located well above riparian habitat. No concerns with this unit as laid out. Leave small clumps of snags (1-5 trees) where safe & practical on the north west side of unit. 9/89			
VISUAL RECREATION			
OBJECTIVE / PRESCRIPTION: SEE ATTACHED Unit meets assigned VQO of Max. Med.			
CULTURAL			
KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM			
OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM			
OBJECTIVE / PRESCRIPTION: Highlead yard. A spot road may be needed in order to get adequate deflection.			
REMARKS			
ARRZ 9/13/89 Recreation; Dec 11/89			



3547c (1456)

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 243 EIS UNIT 106 ACRES 80 LOGGING SYSTEM SS	
STAND # VOLUME FEIS 1450 VOLUME CRUISE	
SALE NAME AA 06	
PHOTO LINE AND NUMBER 37-315	
OBJECTIVES	
Eliminate muskrat along south edge of unit and protect southeast boundary to make up for area deleted.	
SOILS	
Eliminate muskrat along south edge of unit and protect southeast boundary to make up for area deleted.	
HIGH HAZARD AREA	
Soil Scientist field checked unit.	
OBJECTIVE / PRESCRIPTION:	
Compact fill soils require 1 and log supervision.	
No reduce soil disturbance.	
RESULTS OF MONITORING:	
ROAD LOCATION AND OBJECTIVE	
CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION	
Road to Grow Back Naturally	
Discourage timber	
FISHERIES / HYDROLOGY	
CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING	
FHMU TEMPERATURE SENSITIVITY: YES NO	
OBJECTIVE / PRESCRIPTION:	
NO CONCERNS IDENTIFIED 9/89544	
WILDLIFE	
IN HABITAT FOR OLD GROWTH SPECIES NOT APPLICABLE 8/87 9-87	
OBJECTIVE / PRESCRIPTION:	
No sensitive species wildlife habitat is contained in this unit. Leave small clumps of snags in the southwest portion of the unit. Restrict road access to this unit.	
VISUAL RECREATION	
OBJECTIVE / PRESCRIPTION:	
SEE ATTACHED	
Unit meets assigned VPD of Max. Mod.	
CULTURAL	
KNOWN SITE PROBABILITY ZONE HIGH MEDIUM	
OBJECTIVE / PRESCRIPTION:	
Logging System	
Down hill Slackline	
1300-1500' Southern portion of unit could be shovel yarded.	
RRZ 9/13/89	
REMARKS	
Recreation: See attached	



VCU 243 EIS UNIT *108 ACRES 99 LOGGING SYSTEM HL
STAND * VOLUME FEIS 2109 VOLUME CRUISE _____
SALE NAME AA 06 _____
PHOTO LINE AND NUMBER 37 - 315

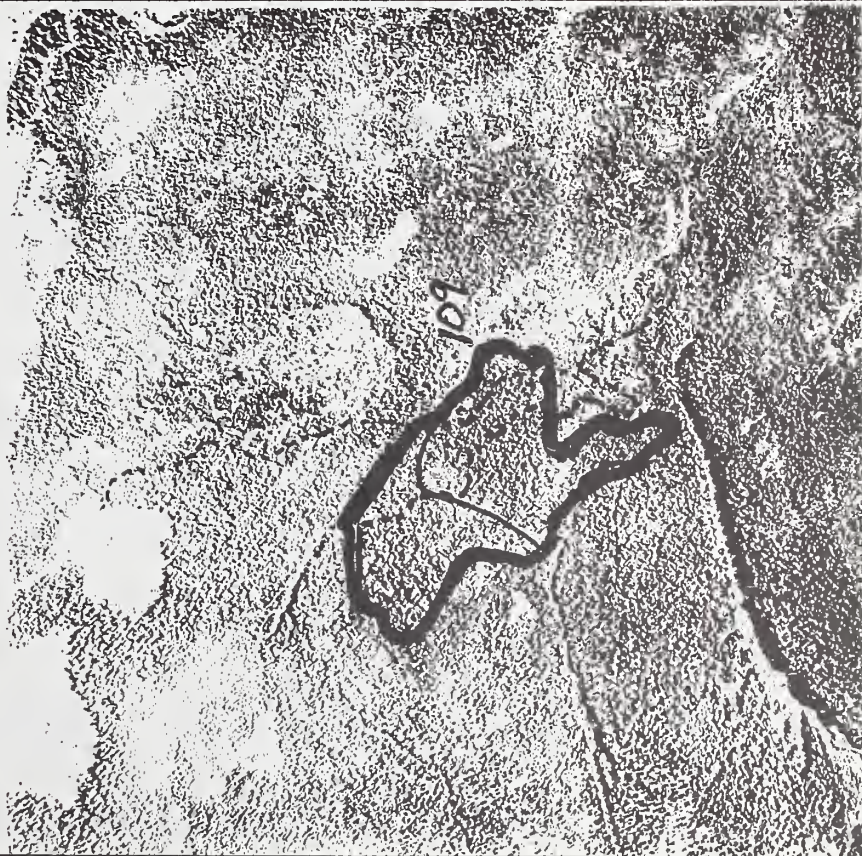
SCALE -



Reservation: See attached

3547c, 3677b 3547c 81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u>	EIS UNIT # <u>109</u>	ACRES <u>56</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>1256</u>	VOLUME CRUISE <u>388-129</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This is a medium site productivity area (Forest under 80). Retain average of 2 snags per acre for diversity.</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
<p>South boundary of unit has slide activity in V-notch - extreme mass wasting hazard. Center of unit bisected by V-notch is sensitive soil zone.</p>			
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
<p>Discourage traffic Allow to grow closed</p>			
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
<p>OBJECTIVE / PRESCRIPTION: MAINTAIN WATER QUALITY IN CLASS III STREAMS.</p>			
<p>AI / AS channel type SPA 9/89.</p>			
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES		
<p>OBJECTIVE / PRESCRIPTION: WITHIN emphasis species habitat. Timber production should be emphasized here. As practice of safe, retain 2 snags and/or standing culls per acre. Down cull logs in various stages of decomposition should not be yarded. Road access to this of the drainage should be restricted. If OBJECTIVE / PRESCRIPTION not needed to manage timber GHL.</p>			
SEE ATTACHED			
Unit meets assigned VQO of Mod.			
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH MEDIUM	
OBJECTIVE / PRESCRIPTION:			
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Grabiniski yard Southern 1/3 of unit with one end suspended due to sensitive soils. Split settings to yard away from V-notch. Rest of unit can be nightlead yarded.		
RRZ 9/12/89			
REMARKS	Reoperation; See Attached		



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u> EIS UNIT # <u>111</u> ACRES <u>115</u> LOGGING SYSTEM <u>HL</u> STAND # _____ VOLUME FEIS <u>3,778</u> VOLUME CRUISE _____ SALE NAME <u>AA 06</u> PHOTO LINE AND NUMBER <u>38B-129</u>		OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This is a medium site (Fair Site index 80). Retain 2 snags per acre for diversity.	
OBJECTIVES		SILVICULTURE SOILS	
HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: V-notch bisects central unit W-side line crosses V-notch SE, corner about V-notch. All are zones of soil disturbance & most working. Soil Separated RESULTS OF MONITORING: may need to assist in buffer layout.		ROAD LOCATION AND OBJECTIVE CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage traffic Allow to grow closed	
FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION:		CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____ No Buffers	
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> OBJECTIVE / PRESCRIPTION: This unit is not located within emphasis species habitat and timber production should be emphasized here. As practice & safe retain 2 snags and/or standing culls per acre. Cull logs should not be yarded and road access to this side of the drainage should be restricted if not needed to manage timber.		VISUAL RECREATION SEE ATTACHED Unit meets assigned VPO of Max. Mod.	
CULTURAL KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:		LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: High head yarding. In central portion of unit use Grabinski with one end suspended around V-notch. Use split settings on each side of V-notch.	
REMARKS:		RRZ 9/12/89 Recreation: See Attached	



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u>	EIS UNIT # <u>112</u>	ACRES <u>85</u>	LOGGING SYSTEM <u>HL</u>
STAND # _____	VOLUME FEIS <u>1720</u>	VOLUME CRUISE _____	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>398-53</u>			

OBJECTIVES	
SILVICULTURE (inher 20) Retain average of 2 suags per acre for diversity.	OBJECTIVE / PRESCRIPTION: Clearcut harvest following up with natural regeneration. Medium productivity site (Fam site)
SOILS of backline prevent mass arising hazard. Unit ch in center bisecting unit is zone of soil disturbance during early yarding.	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION:
ROAD LOCATION AND OBJECTIVE CLOSED ROAD _____ OPEN ROAD _____ Discourage traffic allow to grow closed	OBJECTIVE / PRESCRIPTION:
FISHERIES / MYROLOGY OBJECTIVE / PRESCRIPTION:	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>No</u> OBJECTIVE / PRESCRIPTION: This unit contains no emphasis species habitat. This unit should be managed with a timber production emphasis. Retain 2 suags & Downy logs per acre as specific safe for non-emphasis species. Restrict road access if not necessary for timber mgmt.	NO CONCERNS IDENTIFIED SUP 9/89
VISUAL RECREATION OBJECTIVE / PRESCRIPTION:	SEE ATTACHED Unit meets assigned VQC of Mod.
CULTURAL OBJECTIVE / PRESCRIPTION:	KNOWN SITE _____ PROBABILITY ZONE HIGH _____ MEDIUM _____
LOGGING SYSTEM When yarding near the U-norch, Grabinski yard with one end suspension.	OBJECTIVE / PRESCRIPTION: Highlead logging with split settings on either side of U-norch.
REMARKS De attached - Penetration	RRZ 9/12/89

PLANNED (OPTHO PHOTO)

SCALE: _____



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS) 2643B

VCU <u>243</u>	EIS UNIT # <u>113</u>	ACRES <u>35</u>	LOGGING SYSTEM <u>IS</u>
STAND # <u>—</u>	VOLUME FEIS <u>740</u>	VOLUME CRUISE <u>—</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>398-53</u>			
OBJECTIVES			
<p>PLANNED (ORTHO PHOTO) SCALE: _____</p>			
SILVICULTURE	OBJECTIVE / PRESCRIPTION: Cleanest forests. Preserve (some) young Alaska yellow cedar regeneration. This unit has within an area that has low productivity mainly due to poor drainage. Area is dominated by mixed conifer plant association. Are site under 55 (Farr).		
SOILS	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: Soil survey data inside lay out unit - shallow wet soils comprised of ash present extreme areas wasting hazard possible in SW corner adjacent edge. Soil review or unit modification required.		
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage traffic (low to grow close)		
FISHERIES / HYDROLOGY	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____		
OBJECTIVE / PRESCRIPTION:	NO CONCERNS IDENTIFIED 9/09 SRP		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> OBJECTIVE / PRESCRIPTION: No emphasis species habitat contained in this unit. Manage for nongame wildlife species. Provide 2 suns/acre and 2 down logs/acre as safe practice. Access restriction but not critical. GHL.		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: see Attached Unit meets assigned VPO of Mod.		
CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: slackline yard (1500') down-hill with full suspension		
REMARKS	RRZ 9/13/89 Rec'd 4/10		

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 243 EIS UNIT # 114 ACRES 102 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 2268 VOLUME CRUISE 398-53
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 398-53

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This unit is adjacent to an area harvested in 1973 and certified as regenerated in 1977. This unit is a medium productivity area (Fam S. Index 80). Retain averaging 2 snags per acre.

SOILS HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: 50% disturbance potential may result from potential blind fold in South 1/4 of unit. RAN 9/89

ROAD LOCATION AND OBJECTIVE CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discharge Traffic ~~to~~ allow to grow closed

FISHERIES / HYDROLOGY CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____ OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED 9/89 SH

WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES NO OBJECTIVE / PRESCRIPTION: This unit does not contain any emphasis specie habitats. The shape of this unit is good. Retain at least 2 snags and 2 large diameter cull logs on the ground as practice.

VISUAL RECREATION OBJECTIVE / PRESCRIPTION: SEE ATTACHED Note assigned VPO of Max. Mod.

CULTURAL DOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: Grabinsk yard, with one end suspended, the portion of the unit below the road due to sensitive soils. Highlead yard west of unit. Spr road needed to yard southern portion of unit. RRZ 9/13/89 Int. support needed to log flat, NW corner of unit.

REMARKS Recreation: See Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u>	EIS UNIT # <u>115</u>	ACRES <u>70</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA</u>	VOLUME FEIS <u>1565</u>	VOLUME CRUISE <u>39B-53</u>	
SALE NAME <u>AA</u>	06		
PHOTO LINE AND NUMBER			
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This unit lies within a moderately productive area (For site index 80). Retain average of 2 snags per acre for diversity.</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
	Blind lead due to 2 to 5 running benches permits significant soil disturbance problems. No other soils concerns RHW 9/89		
RESULTS OF MONITORING:			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
			Discourage Traffic allow to grow closed
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FMU	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION:	NO CONCERNS IDENTIFIED 9/4/89 SLP		
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES <u>ND</u>		
	OBJECTIVE / PRESCRIPTION:		
	No specific wildlife concerns. Best to leave 2 snags per acre in small clumps near riparian areas. Allow this spur road to closed with Alder. A.H.		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION:		
	SEE ATTACHED Unit meets assigned VGO of Max. Mod		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH MEDIUM	
		OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION:		
	end suspension due to sensitive soils, Split settings and yard away from U-north. Spur road may be needed to avoid blind lead in central portion of unit. RRZ 9/13/89		
REMARKS	Recreation: See attached		

PLANNED (ORTHO PHOTO)

SCALE:



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u>	EIS UNIT # <u>129</u>	ACRES <u>45</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA</u>	VOLUME FEIS <u>911</u>	VOLUME CRUISE <u>06</u>	
SALE NAME <u>AA</u>	PHOTO LINE AND NUMBER <u>36-95</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest. Prescribe burn unit, burning Alaska yellow cedar, regeneration time. This unit has a 10% to medium productivity ranging from site in deer to 8% (Fair).</p>			
SILVICULTURE	HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: delete 5 acres from NE corner - oversteepened slope next to V-notch as extreme roadside hazards associated sediment gouging risk. Soil seismology needs to be involved in cut layout		
SOILS	ROAD LOCATION AND OBJECTIVE		
<p>CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: 10' High clearance Vehicle Travel</p>			
FISHERIES / HYDROLOGY	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____		
OBJECTIVE / PRESCRIPTION:	FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____		
<p>NO CONCERNS IDENTIFIED SW 9/89</p>			
WILDLIFE	IN HABITAT FOR OLD GROWTH SPECIES: No This unit is not located within species habitat. Timber production should be emphasized here. As practice and safe retention of standing culls per acre. Down cull logs in various stages of decomposition, should not be yarded Road access to this side of the drainage should be restricted if not needed to GML.		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: Manage timber.		
<p>SEE ATTACHED Unit meets assigned VPO of Mod.</p>			
CULTURAL	KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspended. Split settings and yard away from V-notch in center of unit.		
REMARKS	RRZ 9/13/89		
<p>Remarks: See Attached</p>			



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u>	EIS UNIT # <u>130</u>	ACRES <u>70</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>1120</u>	VOLUME CRUISE <u>36-95</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>36-95</u>			
OBJECTIVES			
<p>SILVICULTURE</p> <p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This unit is low to medium productivity, ranging from site index 40 to 80. Return 2 snags per acre for vertical diversity.</p>			
<p>SOILS</p> <p>HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: split yard away from central V-notch No other soils concerns</p>			
<p>RESULTS OF MONITORING:</p> <p>ROAD LOCATION AND OBJECTIVE</p> <p>CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage Traffic Allow for Green Closed</p>			
<p>FISHERIES / HYDROLOGY</p> <p>CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____</p> <p>OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED 7189 SKP</p>			
<p>WILDLIFE</p> <p>IN HABITAT FOR OLD GROWTH SPECIES <u>No</u> This unit is not located within emphasis species habitat. Timber production should be emphasized here. As practice & safe, retain 2 snags and/or standing culls per acre. Down cull logs, in various stages of decomposition, should not be yarded. Road access to this site of the drainage should be restricted if not needed to manage timber.</p> <p>OBJECTIVE / PRESCRIPTION: SEE ATTACHED Unit meets assigned Upo of Mod.</p>			
<p>CULTURAL</p> <p>KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____</p> <p>OBJECTIVE / PRESCRIPTION:</p>			
<p>LOGGING SYSTEM</p> <p>OBJECTIVE / PRESCRIPTION: Highlead yard. Split settings to yard away from V-notch in center part of unit.</p>			
<p>REMARKS</p> <p>RRZ 9/13/89 Recreation: See Attached</p>			

PLANNED (ORTHO PHOTO)

SCALE



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u> EIS UNIT # <u>200</u> ACRES <u>45</u> LOGGING SYSTEM <u>HL</u> STAND # <u>AA 06</u> VOLUME FEIS <u>1038</u> VOLUME CRUISE _____ SALE NAME <u>AA 06</u> PHOTO LINE AND NUMBER <u>41-282</u>		OBJECTIVE / PRESCRIPTION: Clear cut followed by natural regeneration. This unit is on an excellent site (Farr 98-100). Preserve monitoring regeneration and precommercial thinning with wildlife emphasis 12-18 years after harvest. Leave an average of 2 snags per acre for vertical diversity.	
OBJECTIVES		HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: <u>unit design may reduce windfirmness on S.E. corner</u>	
SOILS		ROAD LOCATION AND OBJECTIVE: <u>ROAD EXISTING OPEN TO HIGH CLEARANCE</u> <u>VE HEDGES</u>	
RESULTS OF MONITORING:		CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION:	
FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: <u>NO CONCERN'S IDENTIFIED</u> <u>SEP 9/89</u>		CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____	
WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>Yes</u> OBJECTIVE / PRESCRIPTION: This entire unit lies within an area identified in the 1986-90 APC FEIS to be managed to provide old growth habitat conditions through 1990. The unit also lies within deer winter range habitat. The lower portion of the unit is beach fringe habitat. CHM.		VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <u>5 acres Beach Fringe, 45 acres DWR</u> <u>45 acres old growth.</u>	
CULTURAL KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:		SEE ATTACHED Assigned VPO = <u>Not</u> . <u>unit doesn't meet assigned</u>	
LOGGING SYSTEM away from the 2 v-notches in the unit		OBJECTIVE / PRESCRIPTION: <u>Grabinski yard with one end suspended. Split settings and yard</u>	
REMARKS: <u>RRZ 9/13/89</u> <u>Recreation: See attached</u>		_____	



81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU 243 EIS UNIT *201 ACRES 108 LOGGING SYSTEM HL
 STAND # AA D6 VOLUME FEIS 2445 VOLUME CRUISE
 SALE NAME AA D6
 PHOTO LINE AND NUMBER 41-282

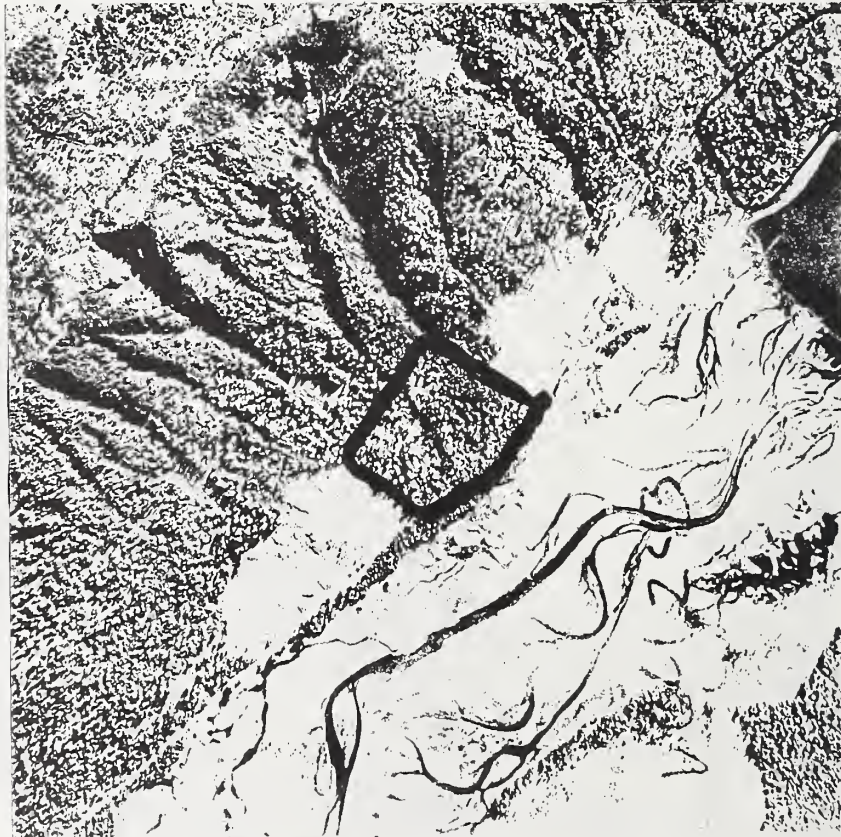
SILVICULTURE
 These stands are all high as registered in 1979 (Std 302) and 1980 (Std 305). This unit is an excellent site (Fav 100). Please note monitoring requirements and precommercial thinning with wildlife emphasis 12-18 years after harvest. Leave an average of 2 snags per acre for vertebrate diversity.

OBJECTIVES

SOILS
 HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION:
NO SOILS CONCERN

PLANNED (ORTHO PHOTO) SCALE:

RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
Road Existing Route High Clearer
Vehicle



FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION:
 CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
 FHMU TEMPERATURE SENSITIVITY: YES NO

NO CONCERNS IDENTIFIED
SUP 9/89

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES Yes

OBJECTIVE / PRESCRIPTION: THIS ENTIRE UNIT LIES WITHIN AN AREA IDENTIFIED IN THE 1986-90 APC FEIS TO BE MANAGED TO PROVIDE OLD GROWTH HABITAT CONDITIONS THROUGH 1990. THE UNIT ALSO LIES WITHIN DEER WINTER RANGE HABITAT. 8/89
108 ACRES DWB, 108 ACRES OLD GROWTH

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION:

SEE ATTACHED
Unit does not meet assigned VPO of Mod.

CULTURAL
 KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Highlead yarding. No other specific concerns

RRZ 9/13/89

REMARKS
Recreation: See Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VQU 243 EIS UNIT 202 ACRES 26 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 565 VOLUME CRUISE
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 40B-39

OBJECTIVES

Unit is adjacent to this stand 281 which was harvested in 1974 and certified as regenerated in 1978. Unit is also adjacent to stand 288 which was harvested in 1975 and certified as regenerated in 1978.

PLANNED (ORTHO PHOTO)

SCALE:



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. This is a high productivity area (Forest Site index 94 to 100). Monitor regeneration and periodically remove a portion of stand at 12-18 years of age with a wildlife emphasis. Retain average of 2 Snags per acre.

SOILS

HIGH HAZARD AREA OBJECTIVE / PRESCRIPTION: Split yard away from central U-notch.

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: Discourage traffic Allow to grow Closed
 RW 9/89

FISHERIES / HYDROLOGY

CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
 FHM TEMPERATURE SENSITIVITY: YES NO
 OBJECTIVE / PRESCRIPTION: MAINTAIN WATER QUALITY IN CLASS III STREAM.

WILDLIFE

AS channel type 9/89 STP.
 IN HABITAT FOR OLD GROWTH SPECIES Yes
 OBJECTIVE / PRESCRIPTION: This unit lies within deer winter range, estuary habitat and an area identified in the 1986-90 APC FEIS to be managed to provide old growth habitat conditions through 1990. 26 acres Estuary buffer, 26 acres DWR & 26 acres Old Growth.

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION: SEE ATTACHED
 Unit meets assigned VGO of Max. Mod.

CULTURAL

KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Highlead yard. Split setting on either side of creek. Yard away from creek

RR 2 9/12/89

REMARKS

Recreation: Lakeville has existing road building activities to minimize the amount of impact. That and use will be an impact to recognize recreation site, two FS. Ratings on the north end of shore of Little Lake. See Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS.)

VCU 243 EIS UNIT # 203 ACRES 75 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 1423 VOLUME CRUISE 36
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 40B

OBJECTIVES

This unit has adjacent to stand
 230 and 233 which logged in 1973 and 1978 respectively.
 Both stands were certified for regeneration in 1976

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE

Regenerate portion of unit above road via natural regeneration. Stand
 yarding is appropriate on the slopes that are 5-20%. This is a very productive site
 (Site is in 1m). Monitor regeneration and precommercial thin portion of unit above road
 in 12-18 years. Return average to 2 sugar pine for diversity.

SOILS

SCA with: well

HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION:

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE: CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION:
 High clearance vehicles only

FISHERIES / HYDROLOGY

CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

OBJECTIVE / PRESCRIPTION:

NO CONCERNS IDENTIFIED

9/89 SGP

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES NO Retain 2 Snags/acre
 OBJECTIVE / PRESCRIPTION: No emphasis species habitat
 is located within this unit. No specific wildlife concerns
 with this unit except for the amount of harvest which
 has previously taken place in this drainage. GHL

VISUAL RECREATION

OBJECTIVE / PRESCRIPTION:

SEE ATTACHED

Unit does not need assigned VGO of PR

CULTURAL

KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Portion of unit below road
 can be shovel yarded. Highhead yard
 portion of unit above road.

REMARKS

RRZ 9/13/89
 Recreation: see attached

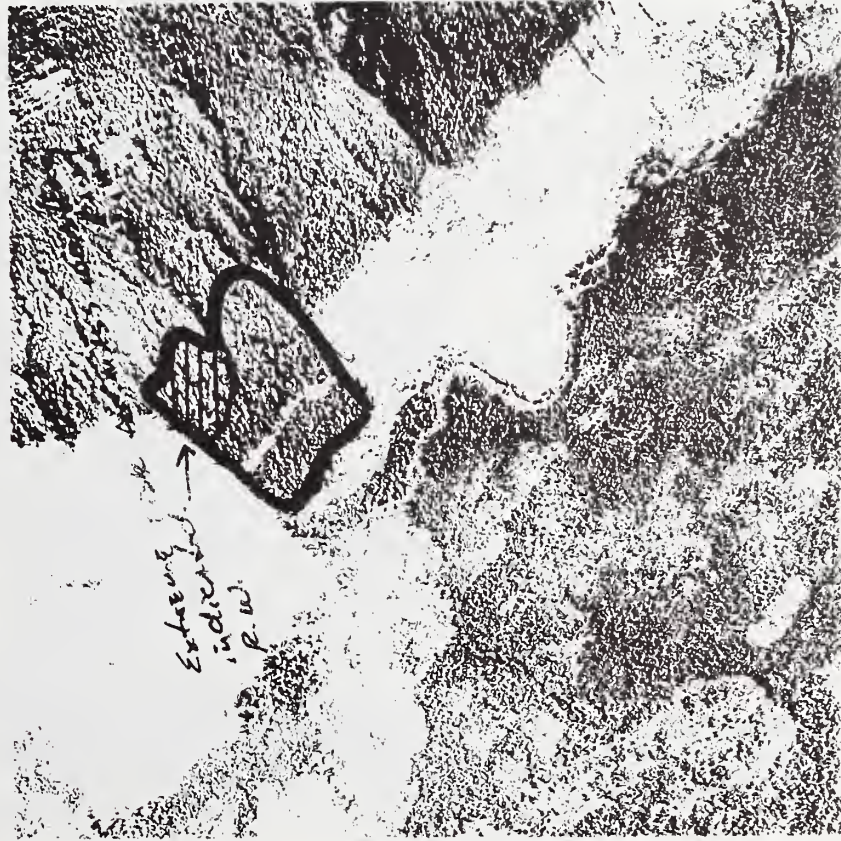
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 243 EIS UNIT # 204 ACRES 111 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 1914 VOLUME CRUISE 38B-128
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 38B-128

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: clearcut harvest followed by artificial regeneration (c. 100 spruce) on lower 2/3 of unit and natural on upper 1/3. Shovel yarding appropriate on slopes $\leq 20\%$. This is a high site area (Fam Site Index 100). Retain average of 2 snags per acre for diversity. Unit is adjacent to stand 143 and 507. 143 was harvested in 1973 and certified as regenerated in 1977. Stand 507 was harvested in 1973 and certified as regenerated in 1976.

SOILS
 HIGH HAZARD AREA ☒ OBJECTIVE / PRESCRIPTION:
 poor stephens of shallow soils and natural slide activity above indicate hi risk for landslides. Soil scientists to walk unit backline during lay out.

ROAD LOCATION AND OBJECTIVE
 RESULTS OF MONITORING:
 CLOSED ROAD — OPEN ROAD — OBJECTIVE / PRESCRIPTION:
 keep open for ground traffic

FISHERIES / HYDROLOGY
 CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —
 FHNU — TEMPERATURE SENSITIVITY: YES — NO —
 OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED
 SUP 9/89
 B.H.H.

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO
 OBJECTIVE / PRESCRIPTION: No emphasis species habitat concern with this unit. This unit should be managed for timber production. Because of the intensity of past harvest in this drainage some old growth habitat should be maintained for habitat diversity. Adjacent units are providing coverd forage.

VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION:
 SEE ATTACHED
 Unit meets assigned VPO of Max. Mod.

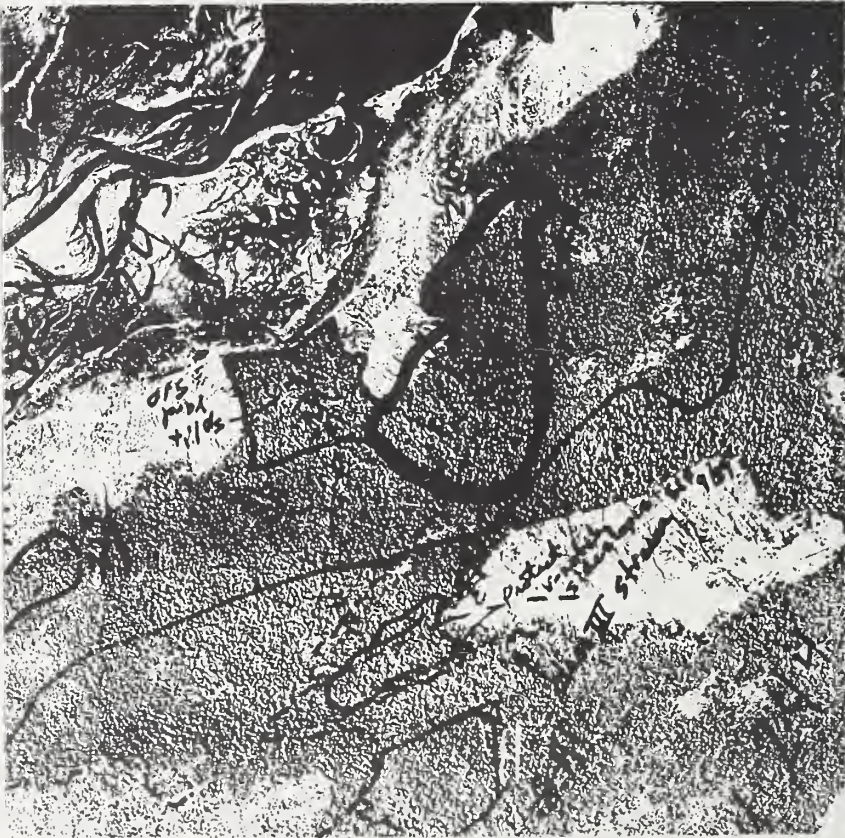
CULTURAL
 KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: High lead yarding. Grabinski yard with one end suspended in the northern portion of unit due to sensitive soils. Areas below and just above road may be suited for shovel yarding.

REMARKS
 RRZ 9/12/89
 Recommendations: See Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>243</u>	EIS UNIT <u>210</u>	ACRES <u>45</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA 06</u>	VOLUME FEIS <u>1038</u>	VOLUME CRUISE <u>408-39</u>	
SALE NAME <u>AA 06</u>			
PHOTO LINE AND NUMBER <u>408-39</u>			

OBJECTIVES	<p>PLANNED (ORTHO PHOTO) _____ SCALE: _____</p> 
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SILVICULTURE	<p>OBJECTIVE / PRESCRIPTION: Clearcut harvest followed by natural regeneration. Adjacent to stand 288 which was harvested in 1975 and certified as regenerated in 1978. This is a low productivity site (Four site Index 66). Prescribe monitoring, regeneration and commercial thinning with wildlife emphasis. Leave an average of 2 snags per acre to improve vertical stand diversity.</p>
SOILS	<p>HIGH HAZARD AREA _____</p> <p>OBJECTIVE / PRESCRIPTION: Maintain 1 and log 1/4th split yard away from the central V-notch. Both to reduce soil disturbance; soils review at discretion of WNT target crew. RAW 9/89</p>
ROAD LOCATION AND OBJECTIVE	<p>CLOSED ROAD _____ OPEN ROAD _____</p> <p>OBJECTIVE / PRESCRIPTION: Local RD Maint Level 1 Let it grow closed naturally</p>
FISHERIES / HYDROLOGY	<p>CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____</p> <p>FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____</p> <p>OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED</p>
WILDLIFE	<p>IN HABITAT FOR OLD GROWTH SPECIES <u>YES</u> <u>9/89</u></p> <p>OBJECTIVE / PRESCRIPTION: Retain 2 snags/acre half of this unit is located in Deer winter range habitat. The existing clear cut unit on the north side of the unit is stocked with 5' or taller vegetation and thus will not be adversely affected by this unit.</p>
RECREATION	<p>SEE ATTACHED</p> <p>Unit meets assigned VPD of Max. Mod.</p>
CULTURAL	<p>KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____</p> <p>OBJECTIVE / PRESCRIPTION: _____</p>
LOGGING SYSTEM	<p>OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspended for sensitive soils and V-notches. Road may need to be extended in order to harvest southeast corner of unit.</p> <p>ARZ 9/12/89</p>
REMARKS	<p>Regeneration; Schedule harvesting over 1 building activities to minimize the amount of years that noise will be an impact to neighboring properties; two FS cabins on the road this is shown on 5/4/80 photo. See Attached</p>

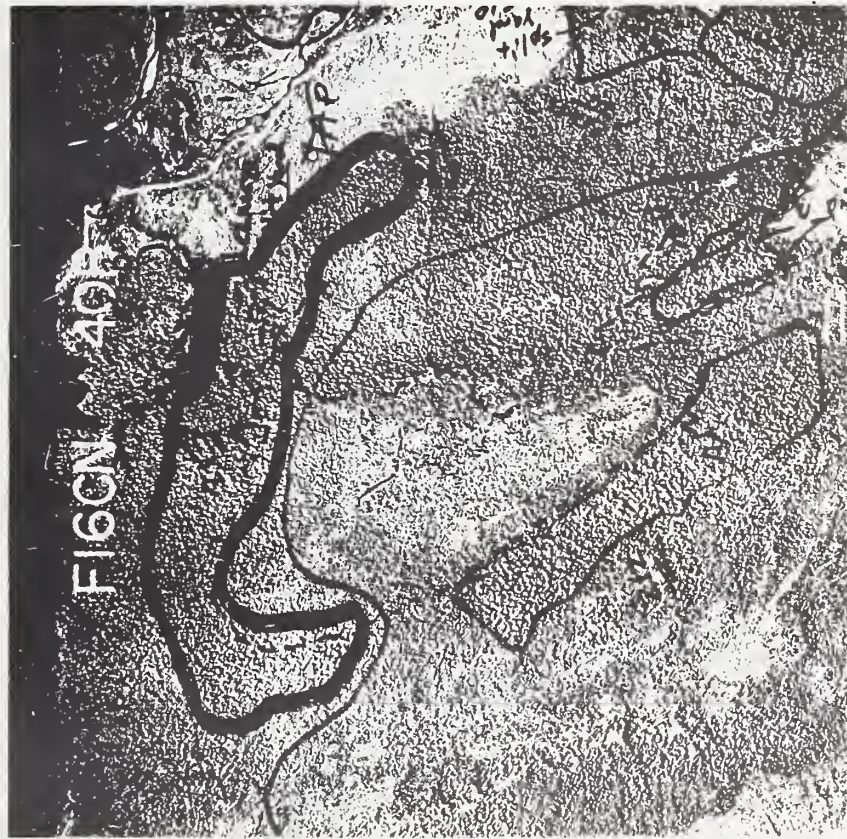
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 243 EIS UNIT 213 ACRES 85 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 1943 VOLUME CRUISE 40B-39
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 40B-39

OBJECTIVES

HIGH HAZARD AREA maintain N. Boundary of unit outside of V-notch. Multiple settings required to minimize soil disturbance.
 OBJECTIVE / PRESCRIPTION: maintain N. Boundary of unit outside of V-notch. Multiple settings required to minimize soil disturbance.
 ROAD LOCATION AND OBJECTIVE Discharge traffic Allow to grow closed
 RESULTS OF MONITORING: Rw 9/89

PLANNED (ORTHO PHOTO) FIGCN 40B-39 SCALE: 1" = 100'



FISHERIES / HYDROLOGY CLASS I CROSSING — CLASS II CROSSING — CLASS III CROSSING —
 OBJECTIVE / PRESCRIPTION: TEMPERATURE SENSITIVITY: YES — NO X —
 OBJECTIVE / PRESCRIPTION: MAINTAIN WATER QUALITY.
 CLASS III STREAM. DO NOT LOG ON V-NOTCH SLOPES
 A1 CHANNEL TYPE. SIP 9/89
 WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES YES —
 OBJECTIVE / PRESCRIPTION: Retain 2 Sags / Ave
 This unit is located within and area identified in the 1986-90 APC FEIS to be managed to provide old growth habitat conditions through 1990. The northern boundary is adjacent to riparian habitat. Allow road to grow closed with Alder or use a closure
 OBJECTIVE / PRESCRIPTION: device to manage access.

SEE ATTACHED
 Unit meets assigned VQO of Max. Mod.

CULTURAL KNOWN SITE — PROBABILITY ZONE: HIGH — MEDIUM —
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspended through V-notches. Fell and yard away from Class II stream buffer strip on eastern portion of N boundary.

RRZ 9/12/89

REMARKS Recreation: Scheduled harvesting road building activities to minimize the impact of noise that noise will be an impact to recreation. Recreation silos, two FS salines on the northern shore of Sitka Lake. See attached.

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 244 EIS UNIT 122 ACRES 100 LOGGING SYSTEM HL
 STAND # 286 VOLUME FEIS 2501 VOLUME CRUISE _____
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 39B-51

SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. (New to high productivity site (Fam site under 91-100). Unit is adjacent to Stand 22 (1899ed 70-71) on 8' stand 122 (logged 192). These stands were certified for regeneration in 75 on 8' 76 respectively. Monitor regeneration on 8 at 12-18 years of age recommended thin with a timber emphasis. Retain an average of 2 Snags per acre.

OBJECTIVES

SOILS
 HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION: _____
 See Attached

PLANNED (ORTHO PHOTO) SCALE: _____

RESULTS OF MONITORING:
 ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION
 Discourage Traffic Allow to grow Closed



FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION: _____
 CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____
 FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____
 NO CONCERNS IDENTIFIED

WILDLIFE
 OBJECTIVE / PRESCRIPTION: _____
 IN HABITAT FOR OLD GROWTH SPECIES NO No emphasis species
 OBJECTIVE / PRESCRIPTION: habitat is located within this unit.
 Intensity of harvest in this area is a concern because of habitat diversity loss. Care should be taken to protect young regeneration in adjacent clearcuts during logging. Retain 2 snags/standing culls of 2 down logs per acre

RECREATION
 OBJECTIVE / PRESCRIPTION: _____
 SEE ATTACHED

CULTURAL
 KP, WN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION: _____
 Unit does not meet assigned VPO of Mod.

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: _____
 Highlead yard. Split settings to yard away from V-notches, particularly in western portion of unit. Uphill Yarding

REMARKS
 ARZ 9/13/89
 Recreation: Schedule harvesting unit
 but logging activities to minimize the impact of operations that will be an impact to the logged area
 sites, two FS actions on the northern shore of Lake, see Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 244 EIS UNIT *125 ACRES 30 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 586 VOLUME CRUISE 398-49
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 398-49

OBJECTIVES

SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration.
 This unit lies within an area that is medium productivity
 (Fem site index 80). Return an average of 2 snags per acre for
 diversity.

SOILS
 HIGH HAZARD AREA SEE ATTACHED OBJECTIVE / PRESCRIPTION:

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD DISCOURAGE TRAFFIC ALLOW RD TO GROW CLOSED OPEN ROAD MAINTAIN DOWNSTREAM WATER PURITY. OBJECTIVE / PRESCRIPTION:

FISHERIES / HYDROLOGY
 CLASS I CROSSING NO CLASS II CROSSING NO CLASS III CROSSING NO
 FHMU III TEMPERATURE SENSITIVITY: YES NO
 OBJECTIVE / PRESCRIPTION: MAINTAIN DOWNSTREAM WATER PURITY.

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO This unit is a good
 OBJECTIVE / PRESCRIPTION careful planning of units in this drainage will provide for habitat diversity and meet timber production needs. This unit is not located in emphasis species habitat. Retain 2 snags & down logs per acre & restrict vehicle access.
 VISUAL RECREATION

SEE ATTACHED

Unit must assigned VGO of Mtd.

CULTURAL
 KNOWN SITE NO PROBABILITY ZONE: HIGH NO MEDIUM NO
 OBJECTIVE / PRESCRIPTION

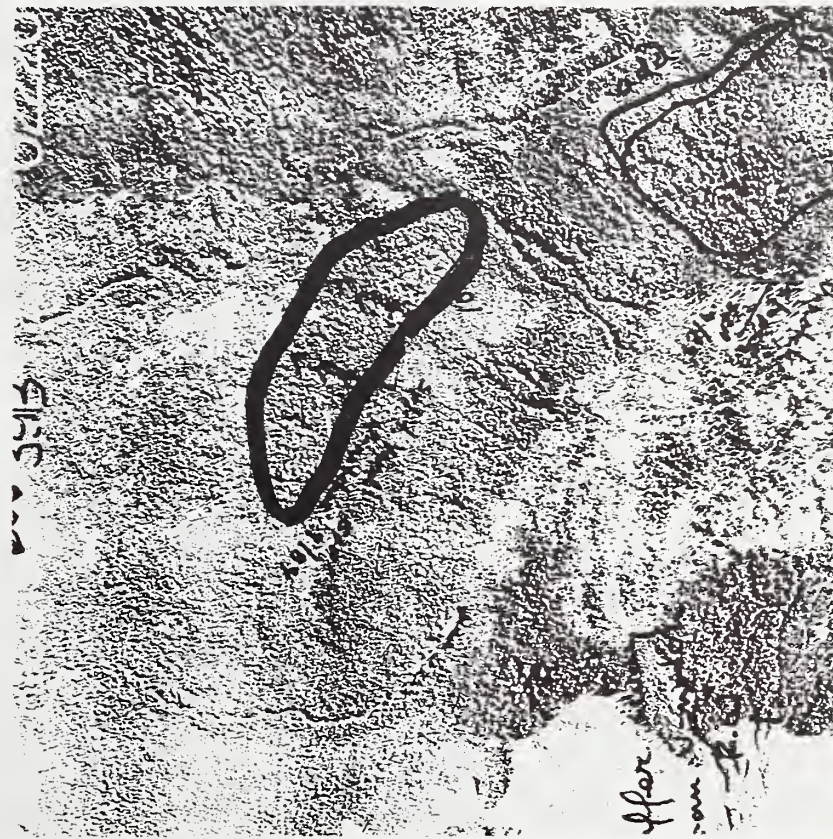
LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspension. Split settings and yard away from V-notches.

RRZ 9/13/89

REMARKS
 Recreation: Schedule harvesting & road building activities to minimize the impact of years that noise will be an impact in the recognized recreation sites; two FS cabins on the northern shore of Sitka Lake. Dec 24/89

PLANNED (ORTHO PHOTO)

SCALE:



3558D

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 244 EIS UNIT # 126 ACRES 35 LOGGING SYSTEM HL
 STAND # AA 06 VOLUME FEIS 172 VOLUME CRUISE 39B-49
 SALE NAME AA 06
 PHOTO LINE AND NUMBER 39B-49

OBJECTIVES

SILVICULTURE

OBJECTIVE / PRESCRIPTION: Clearcut followed with natural regeneration. This is a low to medium site with mixed (Fair) varying from 55 to 87. Stand is a mosaic of high risk clearcut timber and standing live timber. This unit is adjacent previously cleared snags per acre for diversity.

SOILS

HIGH HAZARD AREA

OBJECTIVE / PRESCRIPTION:

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE

CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION:

PLANNED (ORTHO PHOTO)

SCALE:



FISHERIES / HYDROLOGY

CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
 FHU TEMPERATURE SENSITIVITY: YES NO

OBJECTIVE / PRESCRIPTION:

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES NO This unit is not located within emphasis species habitat. Because of the intensity of past harvest and blow down potential, habitat diversity is a concern in this draining. Vehicle access should be restricted to prevent wildlife disturbance. Retain 2 snag & cut logs per acre. Provide for replacement snags.

VISUAL RECREATION

SEE ATTACHED

Unit meets the assigned VPO of Mod.

CULTURAL

KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
 OBJECTIVE / PRESCRIPTION:

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: High lead yard, No other special concerns

REMARKS

RRZ 9/13/89

Recreation: Schedule harvesting and logging activities to minimize the amount of years that noise will have an impact to recognized generation sites, two FS actions on the north side of site. See attached

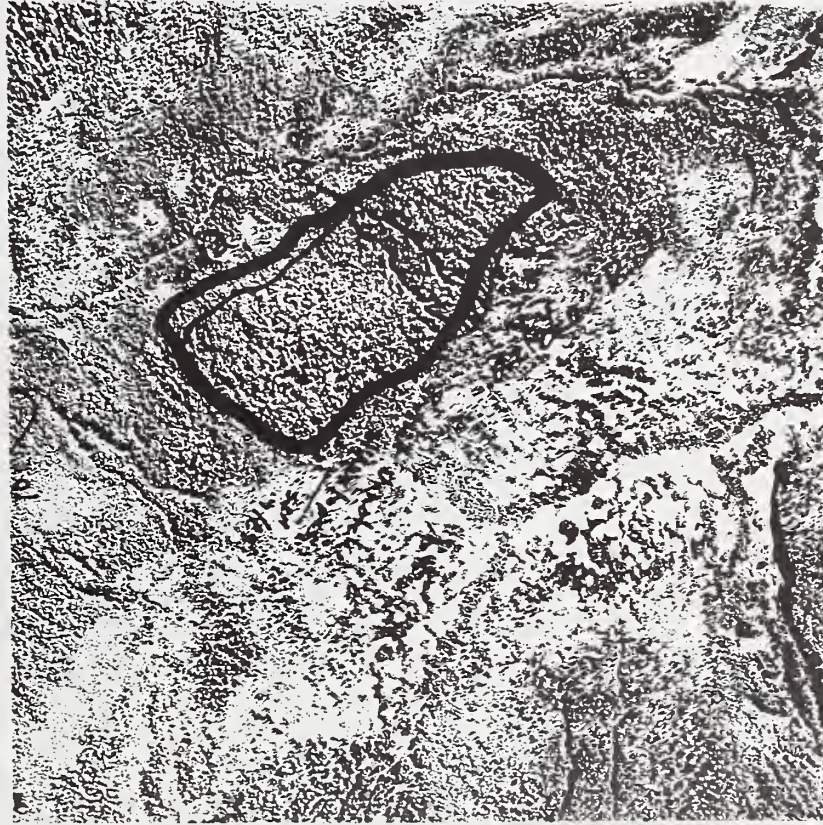
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU	2414	EIS UNIT #	148	ACRES	105	LOGGING SYSTEM	HL
STAND #		VOLUME FEIS	2083	VOLUME	CRUISE		
SALE NAME	AA	06					
PHOTO LINE AND NUMBER			378-49				

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE:



SILVICULTURE	OBJECTIVE / PRESCRIPTION: Clear cut harvest followed by natural regeneration. This area is a site index 88 which is medium productivity. Retain an average of 2 bags per acre for diversity.
--------------	--

HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION:

SOILS

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE	CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage Traffic Noxious grow (Good)
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FISHERIES / HYDROLOGY	CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMJ III TEMPERATURE SENSITIVITY: YES _____ NO _____
OBJECTIVE / PRESCRIPTION:	Maintain downstream water quality. A1 channel type. 9/89 SEP

WILDLIFE
IN HABITAT FOR OLD GROWTH SPECIES No The location of this
OBJECTIVE / PRESCRIPTION Unit is good because it is in a
drainage not already heavily impacted. Future entries should
plan small units dispersed throughout the drainage
with the objective of managing the entire drainage
within one rotation period.

VISUAL RECREATION	OBJECTIVE / PRESCRIPTION: SEE ATTACHED
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Unit meets assigned VGO of Mod.

CULTURAL	KNOW, SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____ OBJECTIVE / PRESCRIPTION:
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LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION: Grubbing Ki yard with one end suspension. Split settings and yard away from V-notches.
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RRZ 9/13/89

REMARKS
Renovation: Schedule harvesting & road building activities to minimize the amount of years that noise will be an impact in the recognized recreation site, two F5 cadences on the northern shores of Smith Lake. See attached

5261 D 247C
81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>244</u> EIS UNIT <u>207</u> ACRES <u>102</u> LOGGING SYSTEM <u>HL</u>	OBJECTIVE / PRESCRIPTION: <u>Clearcut followed by natural regeneration. This unit lies on a low to medium productivity (Class 3 to 4) site. Retain an average of 2 average per acre for diversity.</u>	
STAND # <u>AA 06</u> VOLUME FEIS <u>2077</u> VOLUME CRUISE <u> </u>		
SALE NAME <u>AA 06</u>		
PHOTO LINE AND NUMBER <u>40B - 41</u>		
OBJECTIVES	HIGH HAZARD AREA <u> </u> OBJECTIVE / PRESCRIPTION: <u>No apparent soils concerns in photo</u>	
	SOILS <u> </u>	
	REVIEW <u> </u>	
PLANNED (ORTHO PHOTO)	RESULTS OF MONITORING: ROAD LOCATION AND OBJECTIVE CLOSED ROAD <u> </u> OPEN ROAD <u> </u> OBJECTIVE / PRESCRIPTION: <u>Discourage Traffic. Allow to grow closed</u>	
	FISHERIES / HYDROLOGY OBJECTIVE / PRESCRIPTION: <u> </u>	
	WILDLIFE IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> The northern tip of this habitat (stick on drainage). This unit extends down into riparian timber production. Unit layout will provide a good amount of edge and good forage availability near escape cover.	
	VISUAL RECREATION OBJECTIVE / PRESCRIPTION: <u>SEE ATTACHED</u> <u>Unit does not meet the assigned VQO of Mod.</u>	
	CULTURAL KNOWN SITE <u> </u> PROBABILITY <u> </u> HIGH <u> </u> MEDIUM <u> </u> OBJECTIVE / PRESCRIPTION: <u> </u>	
	LOGGING SYSTEM OBJECTIVE / PRESCRIPTION: <u>High lead yard. Northern portion of unit, north of road, appears flat enough to shovel yard. Grabinski yard southwest portion of unit through V-norches.</u>	
	REMARKS <u>RRZ 9/13/89</u> <u>Recreation: Secluded. Maintaining low logging activity to minimize the amount of years that noise will be an impact to recognize recreation sites. Two FS cabins on the northern shore of Secluded. Dec 1988.</u>	



The Secluded Lake Trail is located - 1/8 mi. will from this unit.

3265D

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 244 EIS UNIT # 208 ACRES 02 LOGGING SYSTEM HL
STAND # AA 06 VOLUME FEIS 2075 VOLUME CRUISE 408-41
SALE NAME AA 06
PHOTO LINE AND NUMBER 408-41

OBJECTIVES

PLANNED (ORTHO PHOTO)

SCALE:



SILVICULTURE
OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. Site productivity in lower to high ranging from 55 to 95 (Favor). Retain an average of 2 snags per acre for diversity.

SOILS

HIGH HAZARD AREA Field OBJECTIVE / PRESCRIPTION: soils request review of unit backline.

RW 2/59

RESULTS OF MONITORING

ROAD LOCATION AND OBJECTIVE
CLOSED ROAD OPEN ROAD OBJECTIVE / PRESCRIPTION: Discourage traffic allow to grow c (asob)

FISHERIES / HYDROLOGY

CLASS I CROSSING CLASS II CROSSING CLASS III CROSSING
FHMU TEMPERATURE SENSITIVITY: YES NO
OBJECTIVE / PRESCRIPTION: NO CONCERNS IDENTIFIED

SEP 9/89

WILDLIFE

IN HABITAT FOR OLD GROWTH SPECIES NO This unit is not emphasis timber production. Snag and down log retention and vehicle access mgmt. will minimize the affect of this unit. Ensure that diversity is maintained by NOT scheduling all timber to be removed in 2-3 entries a few years apart.

VISUAL RECREATION

see Attached
Unit meets assigned VQO of Mod.

CULTURAL

KNOWN SITE PROBABILITY ZONE: HIGH MEDIUM
OBJECTIVE / PRESCRIPTION

LOGGING SYSTEM

OBJECTIVE / PRESCRIPTION: Grabinski yard with one end suspended through v-notches

RRZ 7/14/89

REMARKS

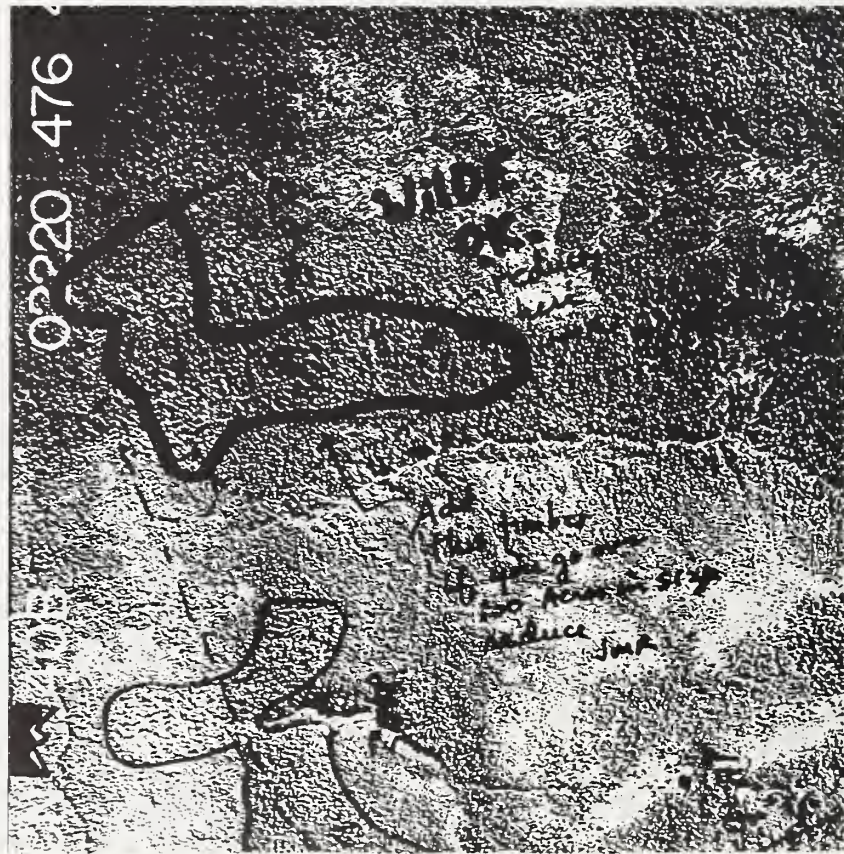
Recreation: Lake shore harvesting road building activities to minimize the impact of year that timber will be in impact to recognized recreation sites, two FS cabins on the northern shore of Grubbs Lake. See Attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU 244 EIS UNIT # 209 ACRES 85 LOGGING SYSTEM HL
 STAND # AA VOLUME FEIS 1890 VOLUME CRUISE 06
 SALE NAME AA PHOTO LINE AND NUMBER 408-41

OBJECTIVES

PLANNED (ORTHO PHOTO) SCALE: _____



SILVICULTURE
 OBJECTIVE / PRESCRIPTION: Clear cut followed by natural regeneration. Site productivity within the unit ranges from (Fair) 80-100. Monitor regeneration and at age 12-18 precommercially thin with a timber production emphasis. Retain an average of 2 snags per acre for diversity, reduce south end of unit and 2/3) two for below the road, with road location on existing boundary. There will be no completed tail
 SOILS
 HIGH HAZARD AREA
 OBJECTIVE / PRESCRIPTION: no apparent soils concerns during photo review. RW 9/89

RESULTS OF MONITORING:

ROAD LOCATION AND OBJECTIVE
 CLOSED ROAD _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION: Discourage traffic Allow to grow closed

FISHERIES / HYDROLOGY
 OBJECTIVE / PRESCRIPTION: CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____

WILDLIFE
 IN HABITAT FOR OLD GROWTH SPECIES NO There is no emphasis on objective / PRESCRIPTION: species habitat located in this unit. Favor Timber mgmt. here. Snag & down log retention and vehicle access mgmt. will minimize adverse wildlife impacts. Ensure that future timber harvest will not remove all timber in 2013
 VISUAL RECREATION
 OBJECTIVE / PRESCRIPTION: entries a few years apart.

SEE ATTACHED

Unit does not meet assigned VPO of PR

CULTURAL
 KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____
 OBJECTIVE / PRESCRIPTION

LOGGING SYSTEM
 OBJECTIVE / PRESCRIPTION: See Silv

Highlead yard, modify unit boundary as suggested by silviculturist.

RRZ 9/14/89

REMARKS

Observation: Scheduled for existing road building activities to minimize the impact of years that noise will be an in part to recognized recreation sites, two FS sections in the unit, the above 85444. State. See attached

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>244</u>	EIS UNIT # <u>211</u>	ACRES <u>17</u>	LOGGING SYSTEM <u>HL</u>
STAND # <u>AA</u>	VOLUME FEIS <u>325</u>	VOLUME CRUISE <u>06</u>	
SALE NAME <u>AA</u>	PHOTO LINE AND NUMBER <u>40B-39</u>		
OBJECTIVES			
<p>OBJECTIVE / PRESCRIPTION: Clearcut following with natural regeneration. This area has a low productivity (Far site index 46). Put in an average of 2 snags per acre for diversity. This unit is adjacent to an existing clearcut. Existing clearcut is a stand 166 which was harvested in 1971. This clearcut was certified as regenerated in 1976.</p>			
SOILS	HIGH HAZARD AREA	OBJECTIVE / PRESCRIPTION:	
		Blind lands can result in excessive soil scarification. Multiple landings recommended RW 9/59	
RESULTS OF MONITORING			
ROAD LOCATION AND OBJECTIVE	CLOSED ROAD	OPEN ROAD	OBJECTIVE / PRESCRIPTION:
			Discourage Traffic Allowable grass Closed
FISHERIES / HYDROLOGY	CLASS I CROSSING	CLASS II CROSSING	CLASS III CROSSING
	FMU III	TEMPERATURE SENSITIVITY: YES	NO
OBJECTIVE / PRESCRIPTION:	MAINTAIN WATER QUALITY		
	IN CLASS III CHANNEL: A2 channel type 9/09, 544		
WILDLIFE/HI	IN HABITAT FOR OLD GROWTH SPECIES		
	NO This unit is not within Mgmt. Should be favored in this area. This size of this unit is good considering that it is adjacent to a large existing clearcut. Stand 166 will provide escape cover next to the new forage produced in this unit.		
VISUAL RECREATION	OBJECTIVE / PRESCRIPTION		
	SEE ATTACHED		
CULTURAL	KNOWN SITE	PROBABILITY ZONE: HIGH MED. M	
	Unit does not meet the assigned VQO of Mod.		
LOGGING SYSTEM	OBJECTIVE / PRESCRIPTION		
	V-norch and class III stream. Do not yard through V-norch.		
REMARKS	RRZ 9/14/89		
	Recreation; Schedule for planting road building activities to minimize the impact of years that noise will be an impact to recreation. EITW, two FS stations on the northern shore of Sittouk Lake. See attached		

81-90 SEIS UNIT LAYOUT AND ROAD LOCATION CARD - PLANNED (AS PER 81-90 SEIS)

VCU <u>244</u> EIS UNIT # <u>212</u> ACRES <u>85</u> LOGGING SYSTEM <u>HL</u> STAND # <u>AA 06</u> VOLUME FEIS <u>2081</u> VOLUME CRUISE _____ SALE NAME _____ PHOTO LINE AND NUMBER <u>408-39</u>		OBJECTIVE / PRESCRIPTION: Clearcut followed by natural regeneration. The majority of this unit has medium productivity, mostly site index 80 (Fair). Leave average of 2 snags per acre for vertical diversity.	
OBJECTIVES		HIGH HAZARD AREA _____ OBJECTIVE / PRESCRIPTION:	
SOILS		No soils concerns RW 9/89	
RESULTS OF MONITORING:		ROAD LOCATION _____ OPEN ROAD _____ OBJECTIVE / PRESCRIPTION:	
ROAD LOCATION AND OBJECTIVE		Discourage traffic & allow to grow closed	
FISHERIES / HYDROLOGY		CLASS I CROSSING _____ CLASS II CROSSING _____ CLASS III CROSSING _____ FHMU _____ TEMPERATURE SENSITIVITY: YES _____ NO _____	
OBJECTIVE / PRESCRIPTION:		NO CONCERNS IDENTIFIED SAP	
WILDLIFE		IN HABITAT FOR OLD GROWTH SPECIES <u>NO</u> OBJECTIVE / PRESCRIPTION: retain 2 snags/acre in clumps. This unit does not affect any emphasis species habitat. This is a well designed unit. If cut this unit will provide good forage availability close to escape cover and a good amount of edge effect.	
VISUAL RECREATION		OBJECTIVE / PRESCRIPTION: SEE ATTACHED	
CULTURAL		Unit does not need assigned up to of Mod.	
KNOWN SITE _____ PROBABILITY ZONE: HIGH _____ MEDIUM _____		OBJECTIVE / PRESCRIPTION:	
LOGGING SYSTEM		Highlead Yard, no special concerns.	
REMARKS		RRZ 9/14/89 Recreation: Schedule harvesting wood building activities to minimize the impact of years that noise will be an impact to recognized recreation sites, two FS. existing on the north shore of 5th Ave. Road. See attached.	

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Road Located AND Surveyed ROAD NUMBER 7520

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

CLASS I-II stream crossings. see attached

LANDS

RECREATION

See Attached -

SOILS

NO CONCERNS

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

see attached

WILDLIFE

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #	6	Road Located & Surveyed	ROAD NUMBER	75204
RESOURCE	RESOURCE CONSIDERATION/RECOMMENDATIONS			
CULTURAL				
FISHERIES	CLASS I floodplain stream crossing. (see attached)			
LANDS				
RECREATION	See attached			
SOILS	See attached			
TIMBER	NO MASS WASTING HAZARD. (Silviculture/Logging System)			
VISUAL				
WATER	see attached.			
WILDLIFE	(see attached)			

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6

Not Recommended

Report for Highway Closure

ROAD NUMBER

75206RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIES

CLASS II stream crossing. see attached.

LANDSRECREATION

See Attached

SOILS

No concerns

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

see attached.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS *open to hi clearance*

AREA # 6 Road Located & Surveyed ROAD NUMBER 7521

RESOURCE RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES CLASS II stream crossings (see attached.)

LANDS

RECREATION See attached

SOILS See attached

TIMBER (Silviculture/Logging System)

VISUAL SEE ATTACHED

WATER CLASS II-III stream crossings. (see attached)
SFP

WILDLIFE (see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Rd Located & Surveyed ROAD NUMBER 7522

RESOURCE RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES CLASS II stream crossings. (See attached)

LANDS

RECREATION See attached

SOILS

TIMBER NO MASS WASTING CONCERNS.
(Silviculture/Logging System)VISUAL SEE ATTACHED

WATER

WILDLIFE See attached S&P
(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Road located & Surveyed ROAD NUMBER 7523

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

see attached.

LANDS

RECREATION

See attached

SOILS

Appear to pass immediately below area with a high landslide hazards in Unit 137-18. See attached.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

*Several Class I-II stream crossings. B5, A3, A2 channels
See attached. ROAD CONSTRUCTION SHOULD BE MONITORED.**SJP*

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #	6	Road Located & Surveyed	ROAD NUMBER	7524
RESOURCE	RESOURCE CONSIDERATION/RECOMMENDATIONS			
CULTURAL				
FISHERIES	Class I flood plain stream crossings. See attached.			
LANDS				
RECREATION	See attached			
SOILS	No concerns			
TIMBER	(Silviculture/Logging System)			
VISUAL	SEE ATTACHED			
WATER	ROAD CROSSES several CLASS I-II streams. (see attached).			
WILDLIFE	(see attached)			

Allow to grow (here)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #	6	Road located & Surveyed	ROAD NUMBER	75241
RESOURCE	RESOURCE CONSIDERATION/RECOMMENDATIONS			
CULTURAL				
FISHERIES	CLASS II STREAM CROSSING. see attached.			
LANDS				
RECREATION	See Attached			
SOILS	Road location is mapped just below areas with a high landslide hazard - see attached. NO CONCERNS IDENTIFIED. SVP 7/89			
TIMBER	(Silviculture/Logging System)			
VISUAL	SEE ATTACHED			
WATER	see attached.			
WILDLIFE	(see attached)			

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 EXISTING / OR Surveyed & Designed ROAD NUMBER 7540

RESOURCE RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

~~Multiple~~ Class I-II stream crossings. see attached.

LANDS

RECREATION

See attached - Possible recreation corridor w/ pull out & trail accesses to the river, a trail running parallel to the river for fishing, an alpine trail for hunting & a cabin for hunting or fishing use.

SOILS

NO MASS WASTING CONCERNS WITH ROAD.

TIMBER

(Silviculture/Logging System)

VISUAL

WATER

Multiple stream crossing within riparian area.
see attached.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6

Not Located

Discouraged

ROAD NUMBER

75403

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

CLASS I-II crossing. see attached.

LANDS

RECREATION

see attached

SOILS

HIGH MASS WASTING HAZARD AREA.

see attached.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

see attached.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 *not located allow to go as close as* ROAD NUMBER 754031

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIES*NO CONCERNS*LANDSRECREATION*See Attached*SOILS*NO CONCERNS*TIMBER

(Silviculture/Logging System)

VISUAL*SEE ATTACHED*WATER*NO CONCERNS*WILDLIFE*(see attached)*

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #	6	Not Located Allow to grow closed	ROAD NUMBER	75406
RESOURCE	RESOURCE CONSIDERATION/RECOMMENDATIONS			
CULTURAL				
FISHERIES				
LANDS	NO CONCERNS			
RECREATION	See Attached			
SOILS				
TIMBER	NO CONCERNS (Silviculture/Logging System)			
VISUAL	SEE ATTACHED			
WATER				
WILDLIFE	NO CONCERNS see attached			

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not located allow to grow closer ROAD NUMBER 75407

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

LANDS

NO CONCERNS

RECREATION

See attached

SOILS

Proposed location ends immediately below an area with a high landslide risk - see attached

TIMBER

NO CONCERNS
(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

WILDLIFE

NO CONCERNS SHP(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow to grow closed ROAD NUMBER 75408

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

NO CONCERNS

LANDS

RECREATION

See Attached

SOILS

Road location pass through areas of high landslide risk in the vicinity of Units 237-30 & 236-31 - See attached

NO CONCERNS

TIMBER

(Silviculture/Logging System)

VISUAL

WATER

NO CONCERNS

WILDLIFE

(see attached)

open to high clear schedule

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located Beyond Existing ROAD NUMBER 7541RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIES*see attached water quality recommendations.*LANDSRECREATION*See Attached*SOILS*NO CONCERNS IDENTIFIED.*TIMBER

(Silviculture/Logging System)

VISUAL*SEE ATTACHED*WATER*see attached. A3 stream crossings.**SDP 9/89*WILDLIFE*(see attached)*

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow to grow closed ROAD NUMBER 75410

RESOURCE RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

CLASS I STREAM CROSSING. See attached

LANDS

RECREATION

See Attached

SOILS

NO CONCERNS IDENTIFIED.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

see attached. B6 channel type

WILDLIFE

(see attached)

81-90 SEIS

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow to grow class ROAD NUMBER 75412

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIES

NO CONCERNS IDENTIFIED.

LANDS

SM.

RECREATION

See attached

SOILS

NO CONCERNS IDENTIFIED.

SM.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

CLASS III STREAM CROSSINGS. see attached.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow grow closed ROAD NUMBER 754121

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

NO CONCERNS IDENTIFIED.

LANDS

RECREATION

See Attached

SOILS

High antibiotic hazard between Units 235-4th E 51

See attached

NO CONCERNS IDENTIFIED.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

NO CONCERNS IDENTIFIED, AP

WILDLIFE

(See attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 *Not Located* *allotment class* ROAD NUMBER 75443RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIES

NO CONCERNS IDENTIFIED.

LANDSRECREATION*See Attached*SOILS*location pass through an area of high risk in Jn 243-213*

NO CONCERNS IDENTIFIED.

TIMBER

(Silviculture/Logging System)

VISUAL*SEE ATTACHED*WATER*See attached.*WILDLIFE*(See attached)*

81-90 SEIS

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6

not located

ROAD NUMBER

75444

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

NO CONCERNS IDENTIFIED.

LANDS

RECREATION

See Attached

SOILS

Road bissects soil hazard area.

see attached.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

NO MAJOR STREAMS CROSSED.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 not located allow to grow closed ROAD NUMBER 75462

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIESCLASS I stream crossings possible. see attachedLANDSRECREATIONSee attachedSOILSNO CONCERNS IDENTIFIED. SEETIMBER(Silviculture/Logging System)VISUALSEE ATTACHEDWATERsee attachedWILDLIFE(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6

Not located

allow to grow closed

ROAD NUMBER

75472

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

Class I stream crossing. see attached.

LANDS

RECREATION

See attached

SOILS

NO CONCERNS IDENTIFIED.

Road location passes just below slope with a ^{SEP} high mass movement hazard
see attached

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

see attached.

WILDLIFE

(See attached)

81-90 SEIS

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6Not located Beyond Existing

ROAD NUMBER

7548RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIESClass I stream crossing. See attached.LANDSRECREATIONSee attachedSOILSTIMBERNO CONCERNS
(Silviculture/Logging System)VISUALSEE ATTACHEDWATERSee attached.WILDLIFE(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 *not located* *Allow to grow closed* ROAD NUMBER 75482

RESOURCE RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

CLASS I stream crossing. see attached.

LANDS

RECREATION

See Attached

SOILS

NO CONCERNS

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

see attached.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS.

AREA # 6 Not Located allow to grow Class. ROAD NUMBER 75483

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIESNO CONCERNS IDENTIFIED.LANDSRECREATIONSee AttachedSOILSNO CONCERNS IDENTIFIED.TIMBER

(Silviculture/Logging System)

VISUALSEE ATTACHEDWATERNO CONCERNS IDENTIFIEDWILDLIFE(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #	6	Not Located	allow to grow Class II	ROAD NUMBER	75491
RESOURCE	RESOURCE CONSIDERATION/RECOMMENDATIONS				
CULTURAL					
FISHERIES	Road crosses 2 Class II channels. Field verify for fish passage concerns ^{since} the anadromous may be present.				
LANDS	SLP				
RECREATION	J. 14. 1/2				
SOILS					
TIMBER	NO CONCERNS IDENTIFIED. (Silviculture/Logging System)				
VISUAL	SEE ATTACHED				
WATER	see attached.				
WILDLIFE	(see attached)				

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow to remain closed ROAD NUMBER 754911

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

NO CONCERNS IDENTIFIED SEP

LANDS

RECREATION

See attached

SOILS

NO CONCERNS IDENTIFIED.

SEP.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

No CONCERNS IDENTIFIED.SEP.~~See attached~~

WILDLIFE

See attached

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS.

AREA #

6

Not Located

Discourage Traffic

ROAD NUMBER

75520

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

NO CONCERNS IDENTIFIED.

LANDS

RECREATION

See Attached

SOILS

Road segment thru ~~the~~ UNIT 14² has a high mass wasting and sediment delivery potential. (see attached)

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

Road crosses several class III channels. (see attached)

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6

Located & Surveyed

allow to grow closed

ROAD NUMBER

75521

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

NONE IDENTIFIED.

LANDS

RECREATION

See Attached

SOILS

Road traverses mass wasting hazard area.
see attached

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

Road crosses Class III channel. High sediment
delivery potential exists. see attached.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located Beyond Existing ^{0.00 to 1.00 miles Circle} ROAD NUMBER 7553

RESOURCE RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES CLASS I STREAM CROSSINGS. B6 channel type

(see attached)

LANDS

RECREATION See attached

SOILS

NO MASS WASTING HAZARD. SPD.

TIMBER (Silviculture/Logging System)

VISUAL SEE ATTACHED

WATER

see attached. SPD

WILDLIFE (see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located all into view C ROAD NUMBER 75531RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIES

NO CONCERNS IDENTIFIED.

LANDSRECREATION

See Attached

SOILS

See attached. Road traverses very high mass wasting hazard areas.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

See attached. Road crosses several class III streams

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow to ? river closed ROAD NUMBER 75532

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

MAY CROSS CLASS I-II stream to access unit 108.
see attached.

LANDS

RECREATION

See attached

SOILS

See attached. Road traverses soil hazard area.

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

ADJACENT TO CLASS II stream segment. see attached

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6not locatedallow to grow closed

ROAD NUMBER

75533RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURALFISHERIESNO CONCERNS IDENTIFIED.LANDSRECREATIONSee AttachedSOILSSee attached.TIMBER

(Silviculture/Logging System)

VISUALSEE ATTACHEDWATERSee attached.WILDLIFE(See attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6Not Locatedallow to grow closed

ROAD NUMBER

75534RESOURCERESOURCE CONSIDERATION/RECOMMENDATIONSCULTURALFISHERIESNO CONCERNS IDENTIFIEDLANDSRECREATIONSee AttachedSOILSNo concernsTIMBER(Silviculture/Logging System)VISUALSEE ATTACHEDWATERSee attached. Spur road bissects unstable slope.WILDLIFE(See attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA # 6 Not Located allow to grow Class ROAD NUMBER 7620

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

Road adjacent to riparian area; no class I crossings identified.

LANDS

RECREATION

See Attached

SOILS

See attached

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

See attached. Class III stream crossings and mass wasting hazards within road corridor.

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6

Not located

alluvial gravel closed

ROAD NUMBER

76201

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

see attached Class I stream crossing.

LANDS

RECREATION

see attached

SOILS

See attached

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

See attached

WILDLIFE

(see attached)

ROAD LOCATION AND CONSTRUCTION RECOMMENDATIONS

AREA #

6

NOT Located

allow to grow closed

ROAD NUMBER

7621

RESOURCE

RESOURCE CONSIDERATION/RECOMMENDATIONS

CULTURAL

FISHERIES

LANDS

see water quality attached.

RECREATION

See attached

SOILS

See attached

TIMBER

(Silviculture/Logging System)

VISUAL

SEE ATTACHED

WATER

Road crosses incised (B6) channel segment to access unit 56.

WILDLIFE

See attached
(See attached)

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